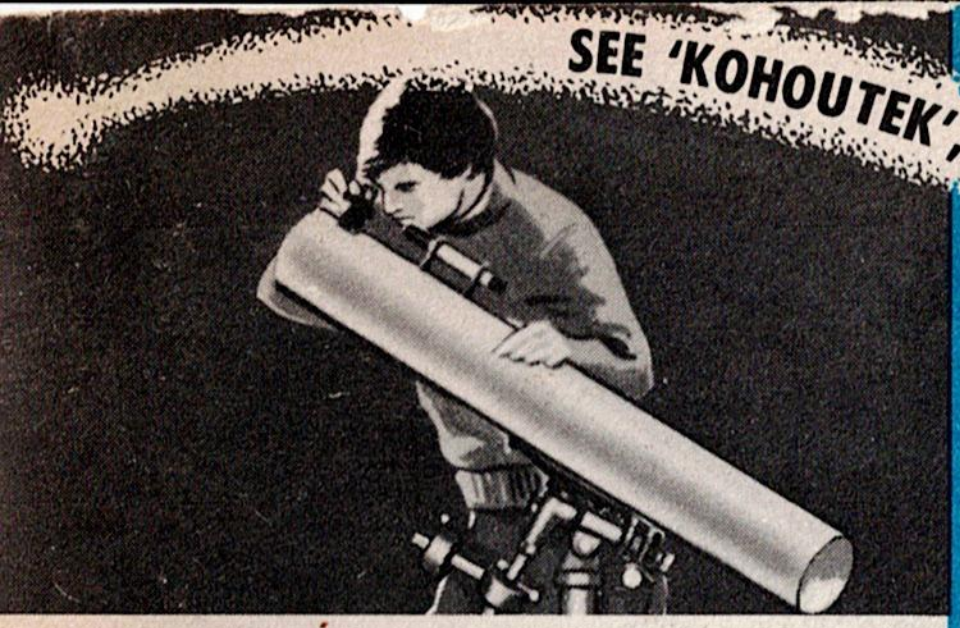
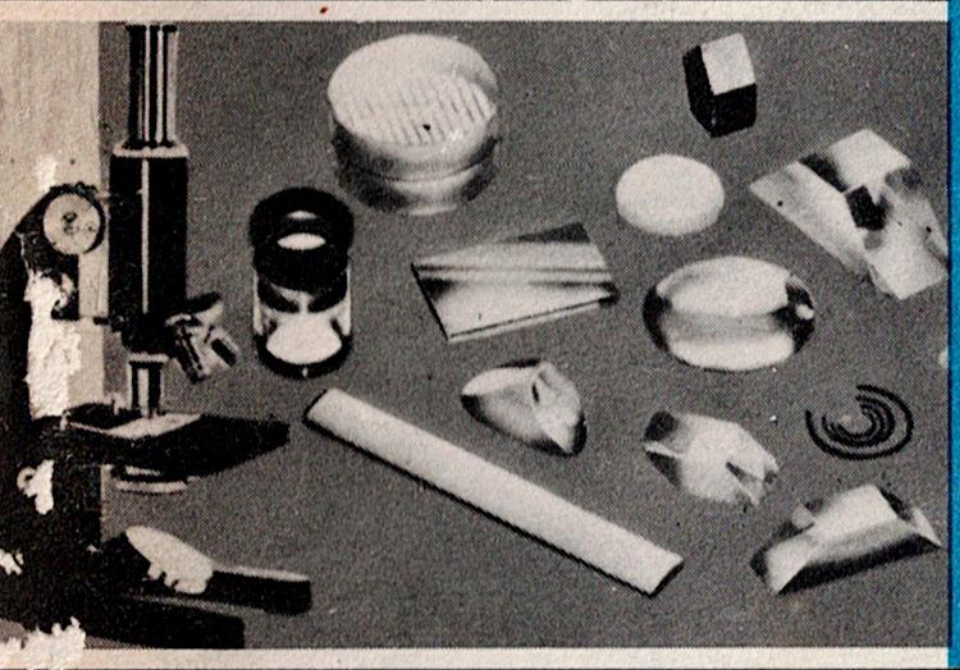


SEE 'KOHOUTEK', THE COMET OF THE CENTURY

CATALOG 742



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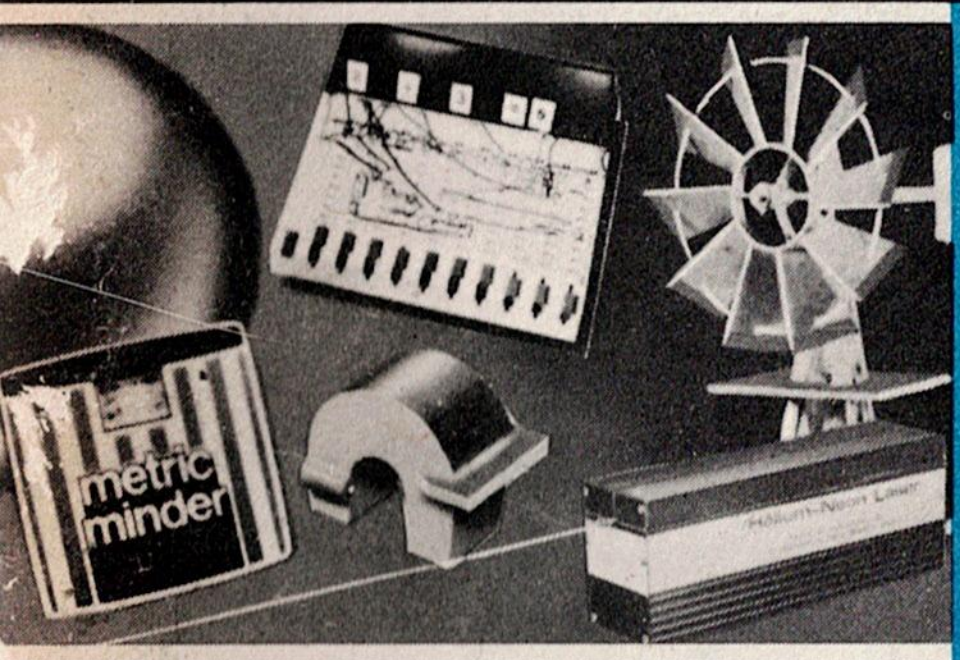

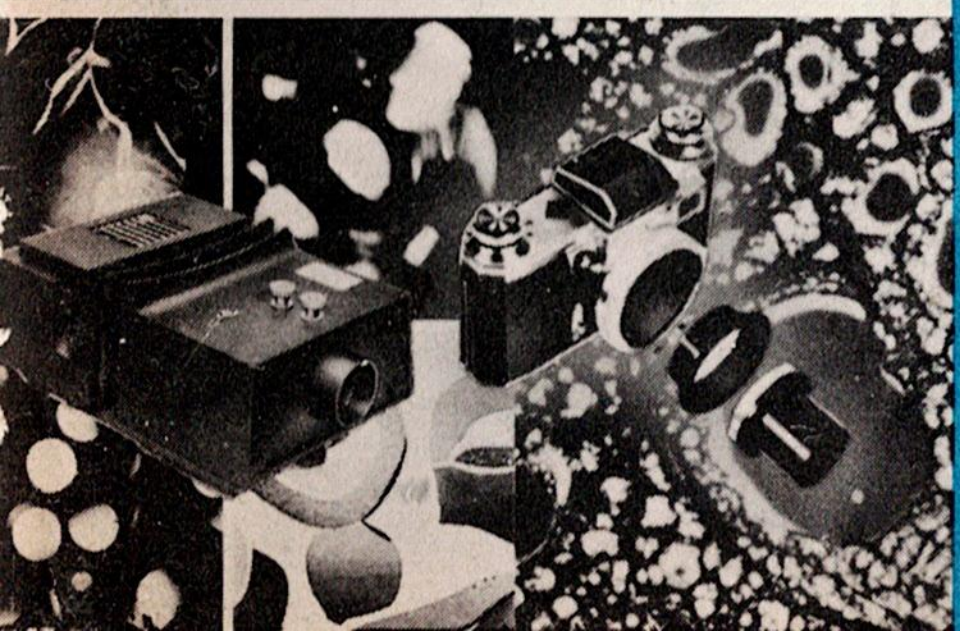

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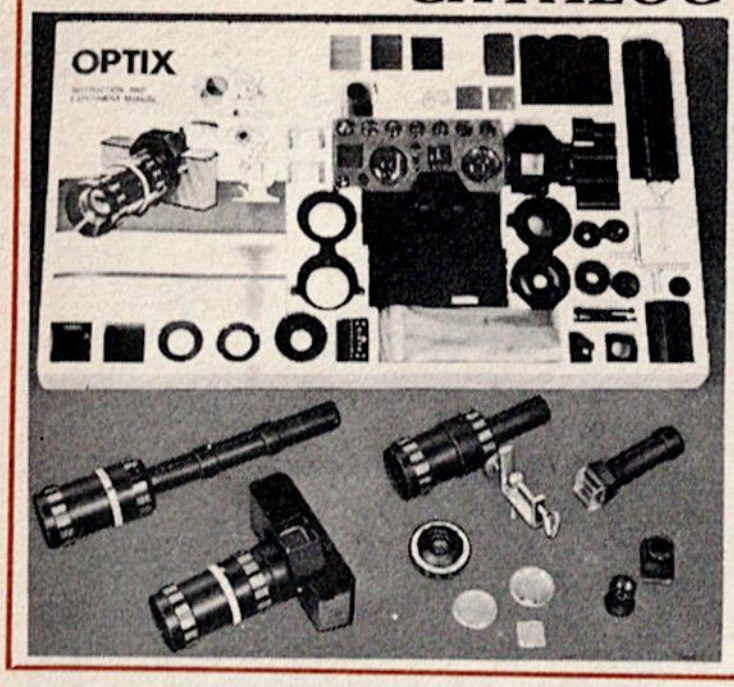


Create Your Own Optics Laboratory

- **Optics Lab Kit Has 135 Experiments**
- **Build A Working 35mm Reflex Camera**

This kit gets our highest recommendation! Everything you need to perform 135 fascinating experiments in optics and photography. Confidently assemble an actual 35mm reflex camera with a completely interchangeable lens system as shown in Modern Photography (Oct. '72). Photos are a snap . . . the camera uses rapid metal film cartridges, so you needn't rewind! You'll learn a great deal and wind up with an SLR camera like no one elses. Stimulating inventions including the periscope, telescope, and microscope are yours to recreate and enjoy! Spend days you'll remember in your own optics lab, acquiring an invaluable knowledge of the science. Fully illustrated, easy-to-understand manual (8½ x 11"; 112 pp.) clearly explains usage of the over 114 precision engineered components contained in this kit. **No. 71,646 $22.50 Ppd.**

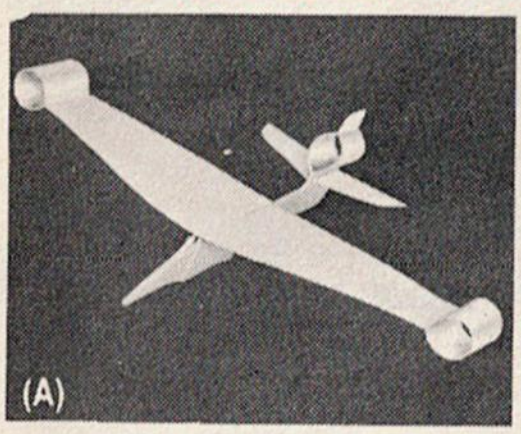
Complete Aeronautics Lab In A Kit!

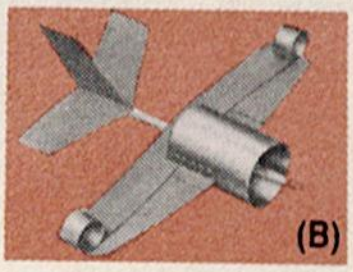
100 Experiments For Creative Minds 12 And Over

A really neat kit that gets our highest recommendation! Explore the whole history of flight with weeks of fun & learning. Learn about air convection, aerodynamics, action-reaction, altitude determination & more. Experiment with the nature of flight and propulsion, air pressure, and space navigation. Construct a glider; a rubber-powered, aileron-controlled plane; a full 27" wing span plane with working ailerons, elevators & rudder; a helium balloon with passenger transport; helicopter; air-driven land vehicle; & a rocket with automatic parachute recovery. Fully illustrated, 159-pg. manual (8½ x 11"), clearly explains each experiment & construction in easy to understand language. Balsa wood, wire, glue, helium, balloons, & plastic parts incl. Some experiments require extra material (usually household items). **No. 71,840 $15.95 Ppd.**

PAPER AIRPLANES THAT ARE FUN TO BUILD & FUN TO FLY!

Great Fun For Kids Of All Ages
20 Wild . . . Unusual . . . Paper Airplanes





(A) Great International Paper Airplane Book

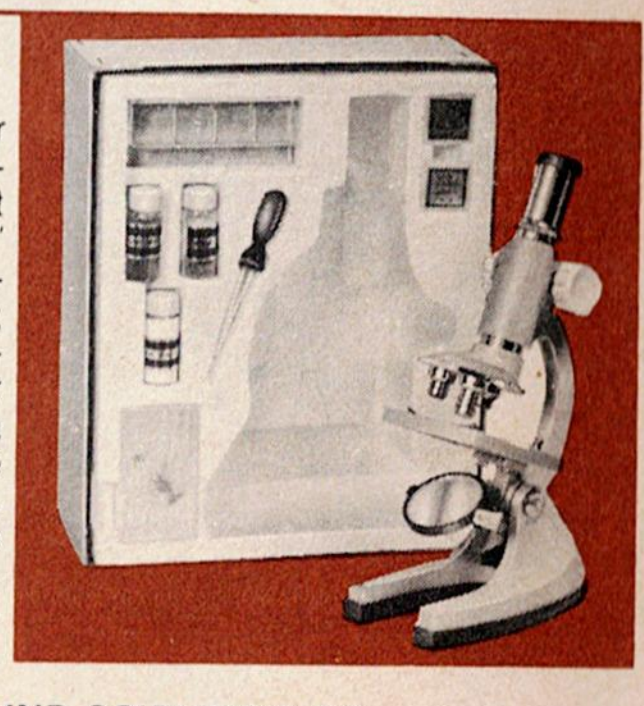
The official fly-them-yourself book of paper airplanes . . . technical data, time-aloft records, photos, and commentaries from the first International Paper Airplane Competition conducted by the "Scientific American." Gives plans of all the winning entries. You won't believe that some of them fly until you try them yourself. Has certain perforated pages so you can tear them out, fold on the printed lines, and make 20 very unusual airplanes. Easy amusing reading and entertainment for young and old. Paperback, 128 p., 9 x 11¾"; by Mander, Dippel, & Gossage. **No. 9391 $2.95 Ppd.**

(B) "Stick-Paper Airplanes" by Robert Steidl Easy-to-follow, detailed plans of 50 different planes! All you need is stick, weight, paper & glue. 114 diagrams; 8½ x 11"; 256pp; pprbk. **No. 9427 $4.95 Ppd.**

The Perfect Beginner's Microscope Set . . . Only $14.95!

We've searched the market to find the best "real" microscope under $30.00. This starter set was by far, the best. A complete assortment of interesting materials, designed to hold the attention of the curious student entering the adventurous world of the microscope. Included with this 7" sturdy metal instrument are many features and accessories ideal for student investigation: geared rack and pinion focusing; durable plastic stage; a fixed 10X eyepiece; 5, 10, and 30X objectives on a revolving turret (powers to 50, 100, 300X); 3 prepared microscope slides, 3 blank slides, 5 cover slips; gum media; a brine shrimp hatchery with salt and eggs; labels; a dropper; plano mirror; fiber & feather specimens; & instr. Entire package only $14.95! **No. 71,811 $14.95 Ppd.**

WARNING: Optics in this excellent beginner's microscope are inferior to our $36.00, No. 70,008 (page 84) that also goes to 300X. The 70,008 features achromats in the objectives for brighter definition, sharper resolution, and larger field.



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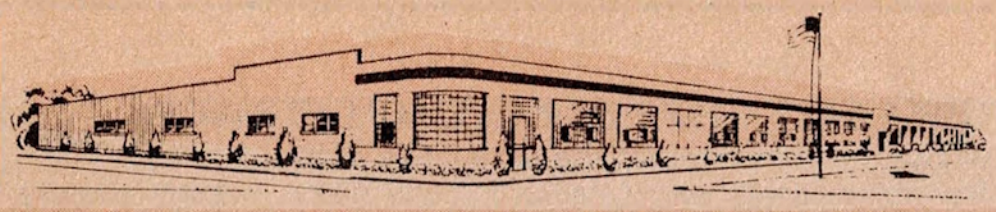

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Gadgeteers ***Students***
Researchers ***Inventors***

Educators
Astronomers
Scientists

Norman W. Edmund, President (at right), and Robert M. Edmund, Vice President, inspecting new supply of low-priced microscopes.

Small and inexpensive sets of chipped lenses, offered to experimenters, started this business 31 years ago. Ever since, our aim has been to discover and offer unique, bargain priced, and hard-to-find items of a scientific nature. Today, you have your choice of 4,500 different products. We continually search for new and unusual items that will please you. Our officers, buyers, and engineers attend numerous trade exhibits and read hundreds of magazines each month, looking for new scientific products at prices you can afford. One of the finest compliments we've received came recently when a customer exclaimed "If there were a Nobel Prize for helping experimenters, Edmund Scientific should get it." While it's been a lot of hard work, it's been a lot of fun too because many of our products are so interesting, fascinating, and fun to demonstrate and bring you.

Satisfaction Guaranteed or Your Money Back

There are no exaggerated product claims in this catalog because we never knowingly misrepresent our merchandise in any way. Each item is described as honestly and as accurately as possible. If you are not completely satisfied with any purchase, return it within 30 days and we will gladly refund your money.

It's Easy and Smart to Buy From Edmund

The enclosed order form is easy to use. No postal calculations are necessary, because even though postage rates have increased year after year, **we still pay postage on most items.** The few exceptions are clearly marked Transportation Charges Collect (T.C.C.). Simply jot down stock number, price, and quantitity of items you want. NO MIDDLEMAN'S COMMISSIONS TO INFLATE PRICES. NO SALESMEN WILL CALL TO ANNOY YOU. And, you don't have to worry about traffic or parking problems.

Browse through this catalog and you'll see for yourself the amazing variety of items we offer you. Tell your friends about us. This will help us to continue to grow and serve you better. Order now for fast service.

N W Edmund R M Edmund

P.S. All kinds of new products are located throughout this catalog . . . we squeezed them in wherever we could. We've also added 16 pages of exciting new products that just arrived. **DON'T MISS PAGES 82-A THRU 82-P.**

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Issued Dec., 1973

Printed In U.S.A.

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HOW TO ORDER

FOLLOW THESE EASY STEPS FOR PROMPT SERVICE

1. **Edmund's Mailing Address.** Please use the one shown on the back cover of this catalog.
2. **Use Convenient Order Blank.** One accompanies your catalog. Include name, present address, and **postal money order or check. Always use the same name and initials when ordering.** This will keep your account straight and assure you of a new catalog each year.
3. Please specify **Qty., Stock No., Description,** and **Unit Price.**
4. **Don't forget Zip Code** . . . yours and ours (08007). You'll get faster service.
5. **Postage.** Edmund pays it on most items except those marked "Transportation Charges Collect" (T.C.C.). On these you pay transportation costs on receipt of merchandise. Call local REA Office for estimated cost.

MINIMUM ORDERS	CHECK or M.O.	C.O.D.	OPEN ACCOUNT to well rated firms
	$5.00	$5.00	$10.00

ENCLOSE CHECK OR MONEY ORDER
On most items Edmund pays postage except those marked Trans. Chgs. Coll.

SERVICE AND HANDLING CHARGE
$1.00 on orders under $5.00
50¢ on orders of $5.00 or more.
(NO POSTAGE STAMPS PLEASE)

MINIMUM C.O.D. ORDER

$5.00 value. You pay postage and C.O.D. charges. **C.O.D.'s can avoid delays on rush orders. No C.O.D.'s on items marked (D/S).** These are shipped to you directly from our source.

MINIMUM OPEN ACCOUNT ORDERS

$10.00 to well-rated firms and educational institutions. Orders under **$10.00** will be processed, however, in addition to the normal **50¢** service charge an additional handling charge will be added so that the order totals **$10.00.** A **$3.00** service fee is the maximum charge.

TERMS ON OPEN ACCOUNTS

Net 30 days. To establish credit send one bank and two commercial references unless well-rated in Dun & Bradstreet.
(Our Dun & Bradstreet number is 00-233-3870.)
All open account orders must be properly signed: if confirming, please indicate.

SPECIAL SHIPPING SERVICES

For special shipping (such as air mail, parcel post, special delivery, etc.,) be sure to include the full amount of these costs. Companies and institutions should authorize invoicing of such costs on their purchase order. Edmund will refund any overage.

ADDITIONAL PRODUCT INFORMATION

Do not include on this order form. It slows down replies. Please use separate sheet of paper.

EXCHANGES OR REFUNDS

Items may be returned within **30 days** if unsatisfactory. No permission required. We do ask that it be returned in the same condition as received and that **original order papers accompany it.**

CANADIAN ORDERS

Minimum order is **$5.00;** Open Account Orders are as discussed at left. Prices and payment are in U.S. dollars. Add 5% (maximum of **$15.00**) to the value of your order for extra postage, handling, etc. No stamps please. Sorry but **no C.O.D.'s** due to postal regulations. To eliminate delays at customs, we recommend that all consumer orders be sent to our Canadian distributor.

Scientific Products Co. 1947 Ave. Road
Toronto M5M-4A2 Ontario, CANADA

Purchase orders can either be sent directly to us in Barrington, N.J. or to Scientific Products Co.

ORDERS FROM COUNTRIES OTHER THAN THE U.S.A. AND CANADA

Minimum Order is $10.00. Parcel Post shipments are subject to international Parcel Post rates of **$1.30** for the first two lbs. and **40¢** for each pound or fraction thereof. Export declarations and consular documentation additional. Prices shown are Net F.O.B. Barrington, New Jersey. If desired, a complete C&F (Cost & Freight) proforma invoice will be submitted upon request.
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To Get A Catalog Quickly: Send 75¢ for 1st class or $2.25 for Air Mail postage.
Merchandise Returns are not accepted without prior approval.

Our Japanese Office: Koyo Corporation, Yurakucho Bldg. 5, Yurakucho 1-Chome, Chiyoda-Ku, Tokyo 100 JAPAN

Price Controls

The prices in this catalog are, to the best of our knowledge, in accordance with price control regulations. Should there be any changes in price controls that require us to change any prices, we shall put the corrections into our computer and you will be charged only the correct price.

Any customer wanting base price information can get it by writing to our Mr. Elmer Robertson. You will receive a quick reply.

IN A HURRY?? TELEPHONE!

Telephone Orders are accepted from 8:00 AM to 5:30 PM Eastern Time, Monday through Friday (July-August, 8:00 AM to 5:00 PM). Phone 609-547-3488. Sorry, we cannot accept collect calls. Routine orders (no technical information) ask for extensions 217, 218 or 220. Orders requiring **technical product information,** ask for extension 272 or 275 from 8:00 AM to 4:30 PM. **Complaints,** adjustments, delivery information, ask for extension 200, 203, 209, 210. **Telex Orders.** Our Telex No. is **831-564.**

EDMUND SCIENTIFIC CO. Guarantee

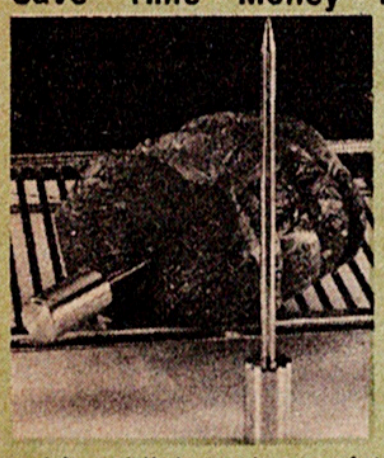
Complete satisfaction or your money back. If you are not completely satisfied with anything you buy from Edmund Scientific Co., return the merchandise prepaid within 30 days, and we will gladly refund your full purchase price.

LATEST NEW ITEMS

Our Marketing and Engineering Departments really went wild and found so many new and different things that there wasn't enough room for them all! Our 164-page catalog is packed with new products . . . we had to scrunch and squeeze them in throughout the catalog. You'll find over 450 new products, new ideas, etc. Begin your Edmund adventure into the unusual today . . . Happy Browsing!

Science Finds New Better Way To Cook Meat

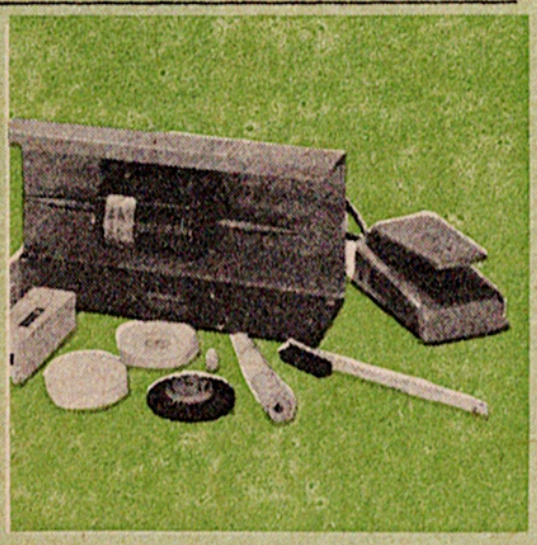
Save • Time • Money • Meat Shrinkage • Fuel



The Sizzle Stick not only cooks meat faster (cuts time & fuel use by 35-50%) . . . so you save heat, it also reduces meat shrinkage 35-50% . . . so you save more than 10% of your meat costs. The result is juicier and more flavorful meat! This is a precision "heat pipe" that you simply insert diagonally through your roast or ham. Made of stainless steel tubing (dishwasher safe) lined on the inner walls with a capillary wick. Normally wasted oven heat boils water (hermetically sealed in tube) to send steaming vapor through inside. Vapor condenses into wick, releasing "heat of vaporization" along entire tube. Wick carries fluid back to handle where it is again vaporized, to complete the continuous heat transfer cycle. Your food cooks from inside out, as well as outside in. Meat cooks more uniformly and basting becomes unnecessary. 11" long Sizzle Stick & complete instr. **No. 60,987 $9.95 Ppd.**

Don't miss other types of heat pipes on page 16.

Metal Polishing Unit



Are you metal crafting and finishing? Working with silver? Then this versatile polishing unit is a must. With all its accessories, you don't need anything else to achieve a dazzling finish on your work whether you are in an industrial shop or your own workshop. 12 x 3½ x 4" Metal Polishing Unit includes 1/15 hp variable-speed motor with a 6-speed foot control; right and left hand threaded, tapered spindles; 2½" round bristle brush; washout brush; square and knife edge felt wheels, cone, ring buff; muslin buff; jeweler's rouge and Tripoli. It's durable and dependable; you save time and get beautiful results. **No. 71,903 $31.50 (includes postpaid delivery)**

Prehistoric Plants??? Yes!

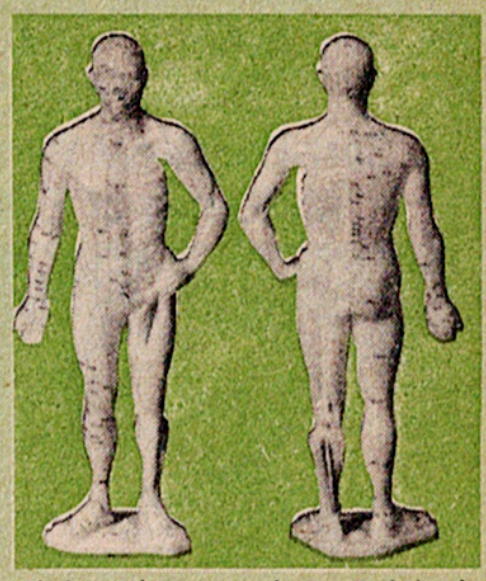
Here's a kit of *living* prehistoric plants . . . smaller today than they were in the past, yet in appearance very much like their ancestors looked when giant dinosaurs ruled the landscape. For millions of years they made up the great forests of the earth & probably formed the coal beds of the world. This is one of the finest collections of plant science project materials available! You get 4 plants: liverwort, club moss, & 2 ferns; plus a sample of petrified wood; 2 dinosaur models; 6 x 6 x 6" clear terrarium; & complete instr. The Prehistoric Plant Kit is perfect as a gift, for the classroom. or as an unusual conversation piece.
(D/S . . . No COD) **No. 19,180 $24.50 Ppd.**

Add more Dinosaurs to your garden, see page 58.

LEARN ABOUT ACUPUNCTURE

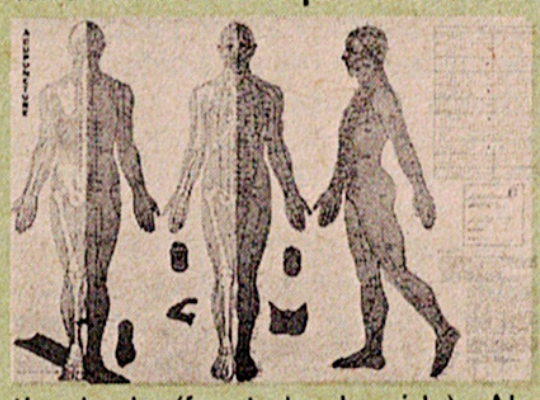
The art of acupuncture, although only recently given world acclaim, has been practiced by Oriental cultures for some 5,000 years. Acupuncture, from the Latin "acus," needle and "pungere," to sting, is believed to have evolved after a warrior, wounded by an arrow, noticed a numbness a great distance from his original wound. This led to the discovery of meridians or channels that run along the body and control functions of various body organs. It is on this and Chinese tradition that the technique is based. According to theory, the major body organs are divided between yin (negative forces) and yang (positive forces). The liver, spleen, and heart, for example, are yin, while the gall bladder, large intestine, and stomach are yang. Life energy, controlled by yin and yang, flows from organ to organ through the network of channels beneath the skin, meridians. Arranged along these meridians are from 500-800 specific points the acupuncturist must learn to pierce. This is the only way to correct the imbalance of yin and yang.

Acupuncture Model



This 11½" solid model is an exact duplicate of those used in the People's Republic of China. It vividly displays the 12 meridians and all their major piercing points. A great visual aid for demonstrating or instructing the principles of this ancient art of needle probing. Comes with a complete reference guide to identify each point, its significance, and location on the model. A great conversation piece and doctor's desk accessory.
No. 71,778 $12.00 Ppd.

Informative Acupuncture Charts



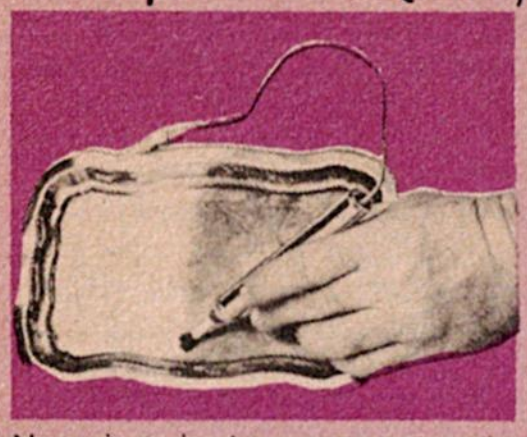
• Clearly show all points & meridians This 22 x 35" two-color chart (illus.) clearly displays the 14 meridians & their piercing points. Written in English, the chart is well labeled in 3 views of the body (front, back, side). Also gives meridian descriptions, needle types, and a complete bibliography. Heavy grey paper. **No. 82,054 $2.95 Ppd.**
For Classroom study order 10 or more @ $2.25 each.

Authentic Chinese Charts—A deluxe set of 4 four-color charts written entirely in Chinese. Very well detailed and excellent for cross reference when using our English text No. 9453 below. Each 14 x 30" on heavy paper. Makes a nice room or office decoration!
No. 71,816 $8.95 Ppd.

"Acupuncture: The Ancient Chinese Art of Healing & How It Works Scientifically" (completely revised). Written by Dr. Felix Mann, Pres. of the Medical Acupuncture Society. Covers points, meridians, etc. The perfect companion for our Acupuncture Charts. Illus., 4-1/8 x 7"; 234 pp; pprbk. **No. 9453 $1.95 Ppd.**

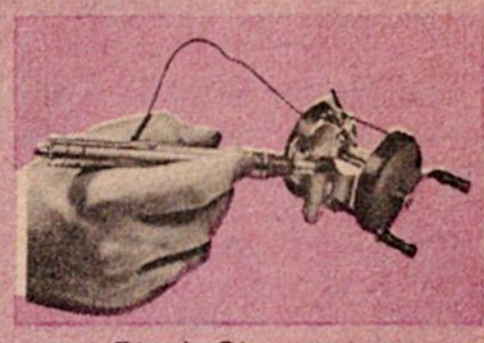
See Embedded Acupuncture Needles on page 15.

Electroplate Metal Quickly & Easily . . . Brush on an attractive, durable finish



• Silver • 24-Carat Gold • Chrome • Copper
• Rhodium • Black Gloss • Antique Black

YOU CAN RESTORE:
Guns, Antiques, Cameras, Silver, Jewelry, Printed Circuits, Portions of Auto Bumpers, Almost every metal.

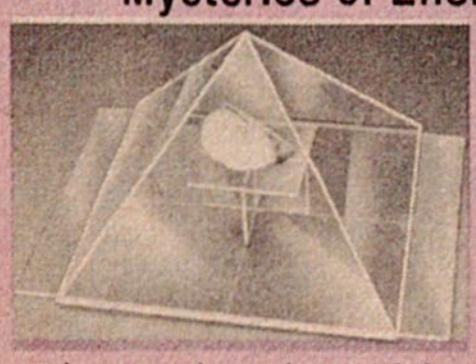


Now, in minutes you can restore scratched, worn or rusted areas of thousands of things. Plate metal on items that weren't plated before . . . jewelry, printed circuits, etc. Easy-to-use kits make it simple, yet provide an attractive, durable finish. Each enables you to electroplate by brush-on or dip procedures. Safe, non-cyanide process. Each kit includes 1 brush and dip-coater heads with anodes, battery cases (uses 2 AA batteries, not incl.), electrolyte, metal polish (to clean surface before plating), wire, clip and complete instr. We offer a selection of 5 metals plus black gloss and antique black.

Silver-plate jewelry, antiques; **Gold**-plate printed circuits, stainless steel, rings; put a **Chromelike** finish on guns, cameras, scopes, model railroads; **Rhodium**-plate for non-tarnishing jewelry; **Copper**-plate tubing, undercoat, pots; put **Black Gloss** on gun barrels, lens housings, microscopes; use **Antique Black** on antique jewelry; and much more for each. All pure metal coatings. Enough to do at least 20 sq. in. and up to 100 sq. in. (depending upon the number of coatings you desire). And it dries instantaneously to look like new.

Electroplating Kits			Refill Kits	
Set	Stock No.	Price Ppd.	Stock No.	Price Ppd.
Silver	61,003	$11.00	42,018	$ 5.50
Gold	61,004	28.00	42,019	13.00
Chromelike	61,005	9.00	42,020	3.50
Rhodium	61,006	33.00	42,021	18.70
Copper	61,007	9.90	42,022	4.40
Black Gloss	61,008	10.00	42,023	5.50
Antique Black	61,009	10.00	42,024	5.50

Science Fact Or Farce???
Can The Great Pyramid Unlock The Mysteries of Energy & Aging?



A few newspaper articles sparked our interest . . . "Pyramid Model Prevents Things From Decaying". "Mummy Mystery Solved?," "85 Shaves With 1 Razor Blade Kept Under Pyramid." They sounded fantastic so we investigated & found some amazing info.

From time to time stray animals would wander into The Great Pyramid and die but their carcasses didn't decay, they dehydrated . . . mummified. Did the ancient Egyptians build the Cheop's Pyramid in such a way that the laws of nature are contradicted? Some people have been using exact scale models of the pyramids and are claiming all kinds of things . . . meat doesn't rot, razor blades stay sharp, things don't rust, and other strange phenomena. All based on energy resonating in an exact scale model of Cheop's Pyramid oriented to true North.

We don't know if there's anything to all this but we've just started experimenting. Since many of our customers are in the forefront of science, we thought many of you will want to experiment along with us. So we've come up with 2 kits. Imagine if these really work! Let us know what you find and we'll compare notes. The Great Pyramid Experiment Kit—already assembled from 1/8" clear acrylic (approx. 6 x 9¼ x 9¼") so you can see what's going on inside. Has interior platform for test material placement. What a conversation piece! Also includes instructions and pyramid facts.

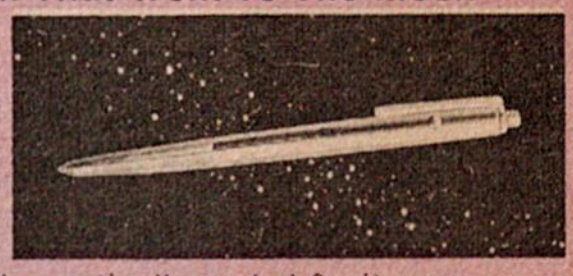
No. 71,817 $20.00 Ppd.

Economy Pyramid Experiment Kit . . . Smaller 6-1/8 x 4¼" high, 8¾" base, 1/16" thick cardboard pyramid. Not see-through but works on same principles. Instructions. **No. 71,896 $3.95 Ppd.**

"Psychic Discoveries Behind the Iron Curtain." Many customers have recommended this book & although we haven't verified the techniques & theories . . . many futuristic breakthroughs could be here. Pyramid Power, Kirlian Photography, Dowsing, ESP, Yoga, etc. 4-1/8 x 7"; 457pp; pprbk. **No. 9452 $1.50 Ppd.**

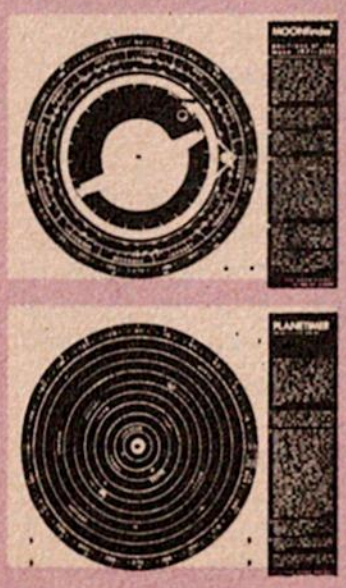
The Ballpoint Pen That Went To The Moon

Writes 3 miles worth in any position . . . upside down . . . underwater



Used by Astronauts on all Space Flights! Because the ink cartridge is hermetically sealed & nitrogen pressurized it operates independently of the surrounding atmosphere. Writes satisfactorily in a complete vacuum or in the freezing cold, boiling heat, the air-less, gravity-less world of Outer Space or special industrial situations. Works when other pens fail at temps. from −50 to +400°F.; doesn't back-leak; writes over glossy surfaces, grease & fingerprints . . . even underwater! Ring design keeps it from slipping even in sweaty hands. There is no more dependable, better writing instrument anywhere on Earth. 5-1/8" long pen plus 1 extra refill.

No. 60,996 $4.95 Ppd.
Pkg. of 2 Refills No. P-61,002 $2.00 Ppd.



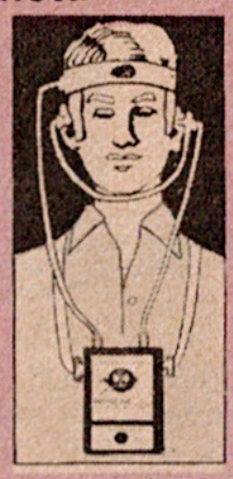
Moon and Planet Finders Give Celestial Positions Thru 2001 A.D.

These 8½" graphic working models of the solar system and lunar motion let you identify phases and positions of the moon and 9 planets in seconds. **Moon Finder** demonstrates when the Moon may be seen, against which constellation, approximate rising and setting times of the zodiacal constellations, approximate ecliptic longitude of the Moon and Sun, and elements of lunar ascending node & perigee. **Planet Finder** tells how & when the 8 companion planets may be viewed, approximate heliocentric longitude in degrees, rough right ascension, ascending nodes & natural satellites of each planet.

Moon Finder No. 9455 $2.95 Ppd.
Planet Finder No. 9454 $2.95 Ppd.
Star Finders, see page 73.

Know Your Alpha From Your Theta

Biofeedback Monitor Lets You Listen To Your Brainwaves



Become Aware of Relaxed and Creative Moods

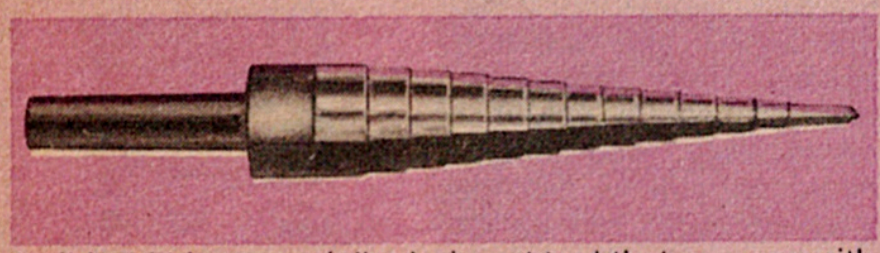
Now a price breakthrough in the fantastic new field of brainwave biofeedback . . . The Edmund Biosone . . . a completely portable, self-contained biofeedback system with accessories. For only $49.95 you get a unit that detects your alpha and theta waves and produces a varying tone that increases or decreases in frequency depending upon your mental state.

Just put on the headband with contact electrodes, plug in earphones, turn on the Biosone, flip filter switch to Alpha or Theta and listen away. You'll be amazed at what you hear. And as you relax more, you'll hear yourself producing more and more alpha and theta.

We carry other more sophisticated, higher-priced biofeedback instruments (see pg. 49), but our Biosone is the perfect introductory unit. It contains switch-selectable narrow-band filters that isolate alpha & theta; and a high-gain low-noise amplifier that yields 5-microvolt sensitivity and eliminates distracting eye-blink interference. The Biosone includes stethoscopic earphones, headband with permanent electrodes, neckband (holds unit so you can move around), electrode cream, high-impact plastic case (approx. 4½ x 2¾ x 1-1/8"), instr., and 1-yr. warranty. Uses one 9v transistor battery (not incl.). Enter the world of biofeedback at a low, low price!

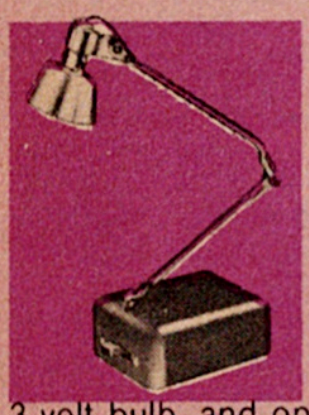
No. 71,809 $49.95 Ppd.

Unibit . . . 13 Holes From One Bit . . . It's Fantastic!



Unibit drill is a specially designed tool that you use with ¼" electric drills. Its unique step configuration enables you to drill 13 hole sizes from 1/8" to ½" dia. in 1/32" increments. Any material ordinarily drilled with a conventional twist drill can be drilled up to 1/8" thickness by this unusual drill. There is no grabbing of metal like conventional drills. Additional uses are reaming, intersecting holes, hole-deburring, pilot holes for wood screws. Unibit cuts quickly into plastic, wood or metal. It is particularly effective for sheet metal (steel, aluminum, brass, copper). One bit does it all.

No. 42,016 $4.95 Ppd.



Unique Mini Battery Lite

Use it anywhere! . . . Camping . . . Boating . . . While traveling . . . Practical at home too!

One of the most convenient light sources we've seen to date. The Roxter portable light features a 9" folding arm, yet weighs only 6 oz. It has a simulated black leather case (2¾ x 2¼ x ¾"); an on/off switch, a 3 volt bulb, and operates on 2 regular "C" cells. Great for small amount of light for map reading, sewing, or as a microscope illuminator.

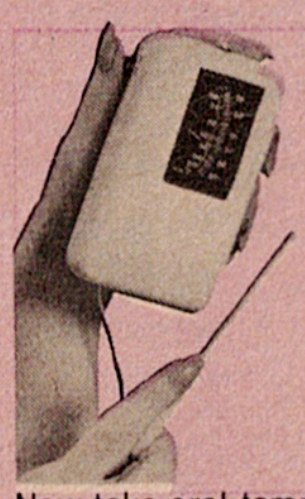
No. 41,984 $7.50 Ppd.

Complete Metric Conversion Kit . . . For An Easy Switch To The Metric System

As the U.S. gradually goes metric, people in schools, business, and industry find themselves puzzled by the new system. This kit makes switching easy and lets you learn the basics of the world's most common unit of measure. To help you in the classroom, on the job, or even at home—we have combined a detailed 54-page paperback book, "The U.S.A. Goes Metric," with a set of handy tools and accessories at an amazingly low price. All let you make instant conversions of length, area, weight, volume, and temperature in just seconds. You get a 9" pocket English/Metric conversion calculator; three plastic 6" conversion rules for avoirdupois, fraction/decimal, Fahrenheit/centigrade, a two meter (6'7") retractable English/Metric metal tape measure, a roll of fifty 0 to 100 centimeter self-stick tape rules, that you can place on machines, lathes, etc., and a laminated 2½ x 3½" wallet conversion card. A must for teachers! Ideal for machine shops, factories, labs, offices, etc. Don't wait—metricate.

No. 71,844 $5.00 Ppd.

9" Metric Calculator only No. 60,988 $1.00 Ppd.
10 or more @ 70¢ each



New Electronic Oral Thermometer Takes Temperatures In Seconds

- **Scientific Breakthrough!**
- **Accurate • Quick • Safe**
- **Hygienic • Hospital Tested**

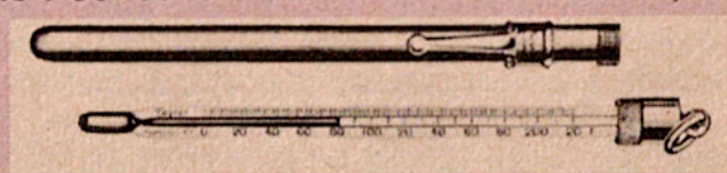
ONLY $25.00

Forget keeping that old-fashioned, mercury-filled glass thermometer under your tongue for long, uncomfortable minutes. What restless child can stay still for that long? Now take oral temperatures in seconds with this revolutionary electronic thermometer. It's more accurate, quick and much, much easier to read than normal thermometers too.

Just place disposable cover over flexible probe, place it under patient's tongue, flick switch and calibrate, flick switch to on and read in 15 seconds. No squinting or holding up to the light, you read big numerals from 90-106°F in ½° from 90-98.6° and ¼° from 99-106°. Compact metal case (2¼ x 4-3/8 x 1¼") fits in your shirt pocket for easy carrying by doctors and nurses. Uses one 9v transistor battery (not incl.). Has complete instructions and a supply of disposable probe covers. Take oral temperatures the modern, quick easy way.

No. 71,849 $25.00 Ppd.

Accurate Pocket Thermometers For Student, Lab or Sportsmen



These lightweight, optically correct thermometers have so many uses. Designed for convenience in general test work. The tubes are easy to read and calibrated for total immersion. Mercury filled; clip-on pocket case. They're even great for campers, skiers, fishermen or anyone needing a quick, accurate temperature reading. Length: 5½".

Farenheit 0 to 220° (2°Div.) **No. 60,991 $5.00 Ppd.**
Centigrade 15 to 105° (1°Div.) **No. 60,992 $5.25 Ppd.**

New! Edmund Marine Aquarium Set

• Great for classrooms
• An exciting new hobby
• Big value . . . Low price

Goldfish and tropical fish interesting? Wait 'till you see this! After extensive research and development we are proud to present our complete Marine Aquarium. We've put together an easy-to-maintain, complete, low-priced, salt water set-up for everyone to enjoy. Teachers can add life to their biology and ecology studies. Proud hobbyists can display living sea creatures in their homes. Imagine—a sea cucumber and horseshoe crab right in your living room! Everything you need is included: 10 gal. all-glass aquarium (20 x 10½ x 12½"), under-gravel filter; quiet dual-power air pump; valves; tubing; hydrometer/thermometer; dolomite gravel; even synthetic sea salts. To maintain your mini-ocean there are test kits for nitrogen and pH, a handy guide to salt water maintenance, and complete instr. Live animals available below. Shpg. Wt. 30 lbs.

No. 85,225 $39.95 T.C.C.

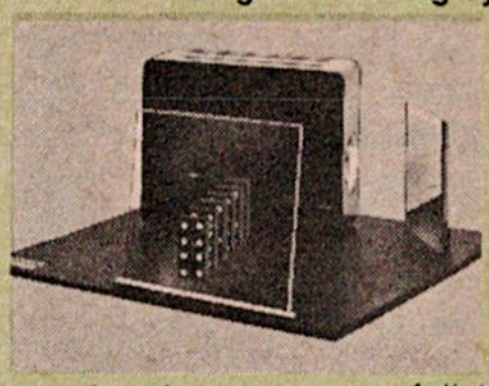
Refill of salts for 10 gal. No. 42,015 $3.00 Ppd.

Living Sea Creature Assortment

Get a fabulous assortment of sea animals for your marine aquarium. This selection contains live representatives from major phyla of the salt water animal kingdom. You get (2) sea anemone, (3) hermit crabs, (6) periwinkle snails, (4) starfish, (1) green crab, (1) spider crab, (1) horseshoe crab, (2) sea cucumbers, (2) purple sea urchins, (2) chiton, and other living surprises. Please specify your phone number and nearest major airport when ordering. (D/S no C.O.D.'s)

No. 19,179 $19.95 T.C.C.

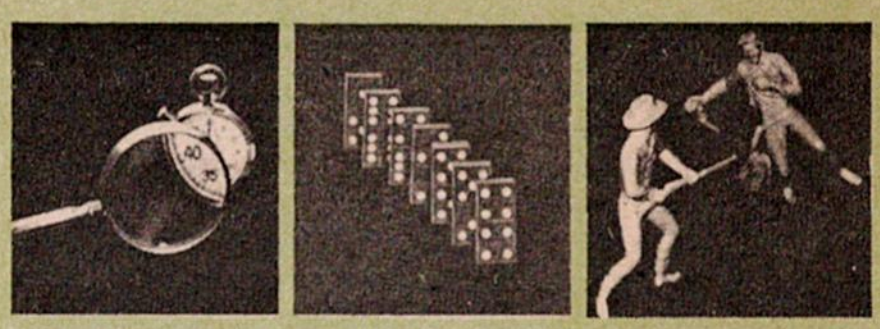
An Entire Hologram Viewing System—Only $99.95



• For Classrooms
• Student Projects • Labs

This completely assembled viewing system adds new excitement and sharpness to the dimensional hologram. It's the best detail we've seen for any price. With this preset system you see a full three dimensional image showing all the depth and parallax found only in real life objects. All big and bright enough for the whole class to see. The set includes a holographic illuminator, 12 x 12" black matte plexiglass base, a mirror to direct the beam, 3 holograms (see below), and a channel to hold them in place. The illuminator includes a bulb, high quality interference filter (5800A-85% peak trans.), lens, transformer, and sturdy phenolic case (6½ x 5 x 2-5/32"). You can even use it separately as a portable source for hologram viewing. Also includes a history of holography, process description, and complete instr.

No. 1639 $99.95 Ppd.



3 Holograms—4½ x 4½" framed acetate **$8.95 ea. Ppd.**

(A) Watch and Magnifier—Unbelievable! The watch face magnifies as you move by it. **No. 42,010**

(B) Dominoes No. 42,009

(C) Cowboys Fighting No. 42,011

At Last! An Odorless, Non-Toxic Preservative

• Gentle On Skin • Great For Schools

Now you can keep specimens indefinitely in a safe and pleasant preservative. Appears orange until specimen is put in. New secret formula becomes clear overnight! 3 glass jars 8-oz. of solution in each.

No. 71,856 $4.50 Ppd.

Deluxe Embedment Kit

. . . For Almost Anything
. . . Even Photographs!

Dried flowers, seeds, photographs, shells, rocks, stamps, butterflies . . . almost anything can be embedded in a solid, clear plastic form. The 60-page illustrated instruction book (8½x11") includes detailed chapters on break-away plastic, ceramic and flexible molds; reusable kitchen molds (i.e. Pyrex® dishes or cup cake tins); special projects such as grapes, bookends, lamps, biological castings, slab & cast tables, etc. Deluxe kit includes: 1 quart of liquid plastic; ½-oz. catalyst; 4 specimen molds (largest 1-1/16 x 3 x 6"); 3 pieces sandpaper; ¾-oz. polishing compound; tweezers; and large assortment of embedments (sea horses, starfish, shells, ferns, etc.). **No. 71,820 $14.95 Ppd.**

"Treasures In Resin" (included in above kit) alone. Full of embedment ideas. 60pp. **No. 9119 $2.98 Ppd.**

Classroom Food Composition Test Kits

Teach Consumer Protection With Nutrition Studies

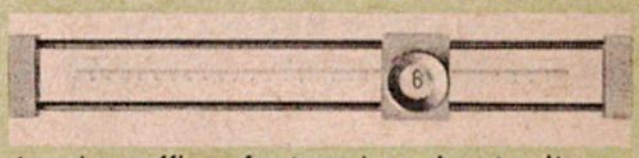
Put some action into those dull health and nutrition lessons. These easy-to-use test kits reveal valuable results about food components as well as provide students with information about judging the foods they now eat. Learn the essential make-up and requirements of protoplasm, the presence of proteins, and essential vitamins. Each kit provides 12 test tubes and enough materials to perform each test 25-30 times. Includes in-depth teacher instr.

Test Kit A—Examine presence of fats, sugars, and proteins in food. **No. 71,852 $12.95 Ppd.**

Test Kit B—Determines composition of milk, determination of Vitamin C, and the discoloration of fruit.

No. 71,853 $12.95 Ppd.

MAGSCALE—Ultra-Accurate Measuring Device

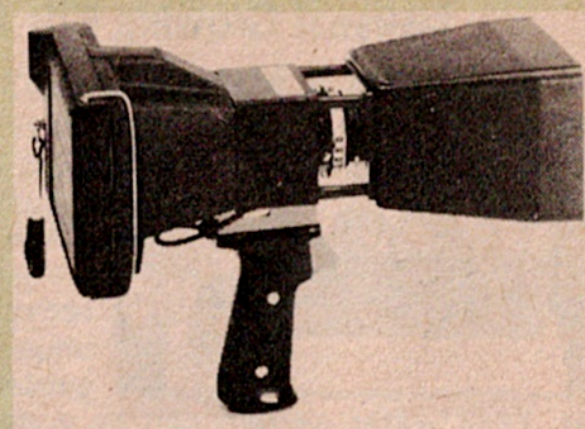


To ±0.01mm

Perfect for fine measuring in lab, drawing office, factory bench, etc. It consists of a glass scale, with a permanent surface scale on the underside. A magnifier moves along the ground steel slides and can be focused directly onto the scale and object. The 300mm scale has 0.1mm sub-divisions and estimations to 0.05mm can be made with ease. Two sets of markings make it perfect for measuring on both light and opaque surfaces. Overall length 372mm; width 50mm. Sturdy leather case. **No. 71,857 $250.00 Ppd.**

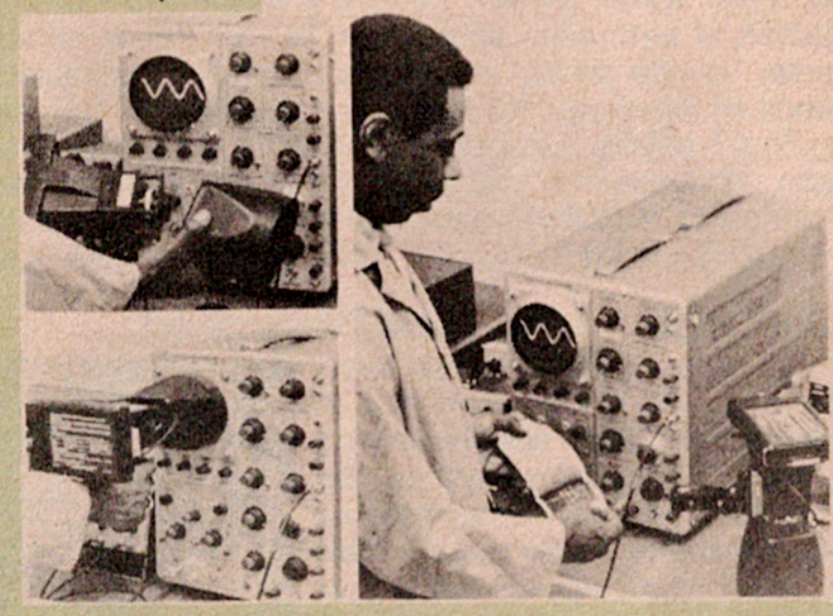
INTERESTED IN OTHER HOLOGRAMS? SEE PAGE 155.

At 1/3 The Cost Of Other Oscilloscope Cameras
POLAROID CR-9 Makes High Quality CRT Recordings



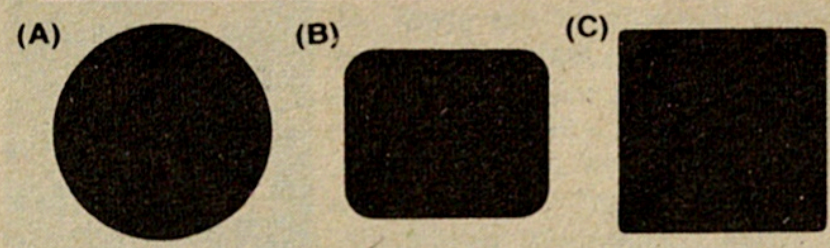
The CR-9 is a new, low cost Polaroid camera especially designed to deliver fully developed, high contrast pictures of nearly all oscilloscope displays, in just 15 seconds. Students, teachers, engineers, and scientists with little or no photographic training can handle the camera with ease. Unlike permanently mounted cameras, this extremely portable (24-oz.) model can be used on demand wherever hard copy records of oscilloscopes are needed. Simply adjust the shutter speed and lens opening according to your display, then squeeze the trigger-like shutter release. You don't have to focus, because the light tight hood (available separately) holds the camera at exactly the right distance for its fixed focus. Uses standard quick-load, Polaroid (3000 speed) type 107 that develops 3¼ x 4¼" prints outside the camera, so you can take pictures in rapid sequence. Pistol grip cable release combination handle comes off for tripod mounting, and you can remove the hood for positive X-ray prints, fingerprints and other high contrast, close-up photography.

Specifications and features include self-cocking shutter (1/30, 1/60, 1/125-sec.), "B" setting for single sweep and time exps., "X" contact triggers transient displays, 70mm variable lens f/5.6-45, magnif. 0.85. Hoods not incl. **No. 1629 $161.00 Ppd.**



Order Hoods Separately By Stock No.

Shape	Size	Polaroid #	Stock No.	Price Ppd.
A.	4.9" dia.	33-15	1630	$21.00
	4.0" dia.	33-06	1641	21.00
B.	3.3x4.8"	33-09	1642	21.00
	3.4x4.7"	33-10	1643	21.00
	3.4x5.0"	33-11	1644	21.00
	3.8x4.7"	33-12	1631	21.00
	3.9x4.9"	33-16	1632	21.00
C.	4.6x4.6	33-18	1633	21.00



End Lengthy Calculations & Involved Diagrams

• Use Unique New CompuTracer
• Every Optical Designer & Engineer Should Have One
• Trace Optical Rays•Ultra Accurate• Fast• No Parallax

No more lengthy geometrical construction of ray diagrams or analytical calculations of light ray paths. The CompuTracer "bridges the gap" between lengthy geometrical construction of ray diagrams and the analytical calculations of ray paths. Now you can easily construct, on paper, the paths of rays through any system of lenses, mirrors, prisms, and even diffraction grating. Develop the curve of an optical element to produce an image at a desired spot. Or save even more time by using with a computer to develop optical systems.

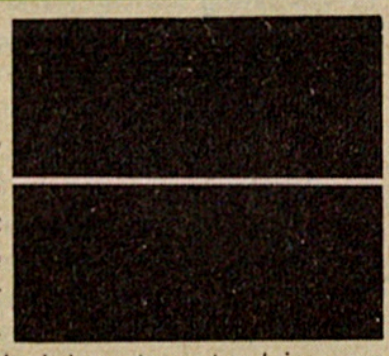
A terrific classroom aid. Students trace rays quickly, demonstrate simple aberrations & even design and check achromatic lenses.

CompuTracer is made of very durable, heavy-gauge transparent plastic, has precision vernier protractor scales that provide angular resolution to 2.5 min. of arc. Includes detailed instructions with practice problems for easy learning.

Professional Model-7½" dia. protractor scales: refractive index to 4.2 (incl. infra-red materials like germanium, silicon, and KRS-5). **No. 71,805 $18.00 Ppd.**
Standard Model-5" dia. refractive index to 2.3 (all common visible and UV matter). **No. 60,980 $12.00 Ppd.**

"Graphical Ray Tracing," Edmund & Brown. Parallel & oblique ray tracing methods to help solve object-image optical design problems. 19 pp. 8½ x 11". **No. 9083 50¢ Ppd.**

Ruled Optical Slits
For High Precision Laboratory Optics



These slits are so accurately calibrated, they show up crisp and clear under microscopic examination at 390X. Single ruled on quartz substrate for thermal stability, their tolerance is ±5% or 2 microns. This laboratory tool is perfect for laser experiments, Newtonian distance and nodal determination, Foucault testing and Schlieren photography. Polished to ¼ wave flatness and coated with aluminum/nickel alloy, the slits are great for experiments in light refraction, studies in Fresnel diffraction phenomena, and measuring the resolving power of optical elements. Exceptional with interferometers, refractometers, optical scanners, and spectrographs. Each slit has a transmission of 2,000Å to 4.5μ, a ruled length of 25mm or longer, and a substrate size of 1" dia. x .06" thick.

Stock Number	Slit Width	Price Ppd.
19,146	1 Micron	$107.00
19,147	2 Microns	90.00
19,148	4 Microns	60.00
19,149	5 Microns	60.00
19,150	7 Microns	50.00
30,685	10 Microns	50.00
19,152	20 Microns	50.00
30,686	25 Microns	50.00
19,154	30 Microns	50.00
19,155	40 Microns	50.00
19,156	50 Microns	40.00
19,157	75 Microns	40.00
30,687	100 Microns	40.00
19,159	250 Microns	40.00
19,160	300 Microns	40.00

Ususual Growing Kits For A Better Understanding of the World of Botany

Ever Hear Of A Water Garden?

Well now you can plant one! It only takes a quart or so of water, a few old jelly or pickle jars (do your own recycling), and the 6 unusual living water-garden plants in this kit. Your water garden can be a decoration in the kitchen or bathroom, an addition to your home nature center, or the perfect educational activity to stimulate minds of every age. Kit includes a selection of the following 7 plants: Dracaena sanderinii, Neanthedella palm, Philodendron, Cordatum, Philodendron micans, Pothos and Nephthytis; plus "starter tanks" & complete instr. (D/S . . . No COD) **No. 19,182 $18.95 Ppd.**

Propagation: A Learn By Doing Kit

Discover, by doing, the amazing ability of plants to duplicate themselves from seed, leaves, joints & tips. A fascinating science course in itself, the Plant Propagation Kit has 2 kinds of "rooting" materials (vermiculite & horticultural peat) for experimenting, plus 3 healthy plants and coffee seeds. You'll experiment with: Sansevieria hahnii which propagates from leaf cuttings; Aluminum Plant from tips; Philodendron from joints; and coffee from seeds (beans). Kit includes parent or stock plants; seeds; soil; starter pots; & complete instr. (D/S . . . No COD) **No. 19,183 $19.95 Ppd.**

Living Leaf Kit . . . Leaves That Do The Unexpected

A fun way to learn some basic Botany . . . the significance of leaves, how they supply us with oxygen, what chlorophyll is, etc. The lesson is fascinating because you work with leaves that are able to grow (propagate) new plants (usually the role of the seed). All you do is pot the leaf and have fun watching the young plants develop. Includes leaves from such exotic plants as Bryophyllums, Sansevieria hahnii and peperomias; small plastic pots; vermiculite; peat moss; & instr. Excellent Science Fair material. (D/S . . . No COD) **No. 19,184 $14.50 Ppd.**

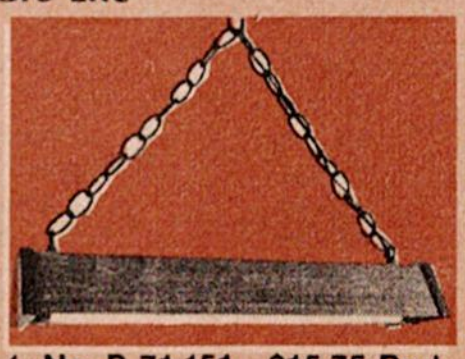
Lichens . . . 2 Plants In One!

This Lichen Study Kit shows the communal arrangement (looks like a single plant) of a fungus and an algae living together to the mutual benefit of both. There are 3 different types of lichens: Foliose are lobed & leaflike and are usually attached to the rock or treebark on which they grow; Fruitcose stand erect & may be branched many times; Crustose grow as a crust on rocks or on wood. Your kit contains 6 colorful lichens incl. one or more from each type plus an informative sheet with facts & suggestions. Study lichens for an unusual class report or use them for model trees on train layouts. (D/S . . . No. COD) **No. 19,185 $12.00 Ppd.**

Indoor Growing Fixture For Wall or Table

Attractive fixture mounts easily on wall or sits on table or counter. Use for controlled plant lighting in classrooms . . . or start an herb garden (seeds incl.) in your kitchen. Avocado green plastic planting tray & lid housing measures 8 x 12 x 18" high. Tray is great for flower pots . . . or planting right in it. An 8 watt 12" Gro-Lux bulb is mounted in lid (interior finished in diamond patterned aluminum). A stand of avocado sprayed & fired steel connects lid & tray (hanging bracket & wall mounting screws incl.). 6 seed pots with hydroponic soil and oregano, sage, chive, thyme, basil & parsley seeds and instr. incl. **No. 71,839 $26.50 Ppd.**
Replacement Bulb **No. 71,843 $ 4.50 Ppd.**

18" Hanging Terrarium Gro Lite



Perfect for any location. Allows you to adjust the distance between the light and your plants sitting on a table or counter. Incl.: 18" Gro Lux bulb, 10-ft. cord, and on-off switch.
No. 71,845 $19.50 Ppd.
Replacement Bulb Pkg. of 4 **No. P-71,151 $15.75 Ppd.**

Dry Flowers Faster . . . Use The Botany Press

Create your own "real flower" heirlooms . . . pictures, placemats, and bookmarks . . . easily with the Botany Press! Great for classroom projects. It not only dries flowers faster but the flowers retain more color and do not turn brown from contact with newspapers. In 7 days most flowers are ready to be framed! 10 to 12 layers of flowers can be put in the press at one time. 7¾ x 9¼" press comes complete with hardware, processed drying papers, and complete instr. **No. 71,808 $8.00 Ppd.**
Extra Drying Papers **No. 60,983 $1.65 Ppd.**

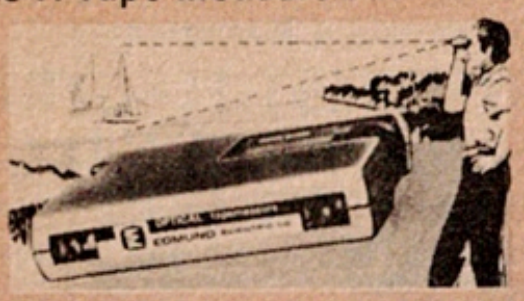
Looking at the world thru rose-colored glasses is nothing compared to this!

Spectrums . . . the psychedelic glasses that tint your whole world with the brilliant colors of the spectrum. A bright light looks like a technicolor snowflake . . . speeding headlights at night are a spectacular moving rainbow. Diffraction grating is the secret . . . it breaks up light into the colors of the spectrum. Great in the classroom to vividly demonstrate the spectrum . . . fun to show off anywhere! One size fits all. **No. 41,996 $3.98 Ppd.**

"The Indoor Light Gardening Book" by G. A. Elbert. Illus.; 250pp; 7 x 10"; hrdbk. **No. 9448 $10.95 Ppd.**
"Bonsai". How-to book on culture & care of miniature trees. Illus.; 80pp; pprbk. **No. 9444 $1.95 Ppd.**

"Terrariums & Miniature Gardens". Step-by-step guide. Illus.; 8¼ x 10¾"; 80 pp; pprbk. **No. 9457 $1.95 Ppd.**
"The Practical Book Of Organic Gardening" by Allan Swenson. Illus.; 236pp; pprbk. **No. 9446 $1.25 Ppd.**

Turn Your Eyes Into A Tape Measure . . .



And measure distance & height without moving an inch! This precision Optical Tape Measure is a reliable, easy way to take measurements from 6 to 100 ft. Compact & lightweight (only 8 oz.), it eliminates need for help from another person, or to climb up, over or move obstacles. Works indoors or out, so you save time, labor & guesswork. Just sight object (fence post, buoy, roof peak, blade of grass, electrical outlet, etc.) through viewfinder. Turn focusing dial until one sharp image is seen. Then glance at tape indicator to read distance in feet and/or inches. The extra long 18" tape readout provides superb accuracy, better than dial type! Ideal for use by contractors, real estate agents, hunters, boaters & decorators. Great for estimating amount of shingles or house paint needed, measuring skid marks, etc. Accuracy to 25-ft. is 99.2%, to 100-ft., 97.8%. 5½ x 3¼ x 1-1/8". Case & instr. incl. 5-yr. mfr. warranty.

No. 60,990 $19.95 Ppd.

GIVE AN EDMUND GIFT CERTIFICATE

Need a gift for a birthday? Holiday? Graduation? Christmas? An Edmund Gift Certificate makes an unusual and appreciated gift! (Available from $5.00 and up in increments of $5.00)! Specify **Gift Certificate** on your order and include the proper amount. If you want it sent direct to the recipient, be sure to give us the complete name and address. We'll send the certificate (with your name as donor) and our catalog. A unique and practical gift sure to please!

Super Sleuth . . . "fingers the fibber!"

A new electronic action game for the entire family

Who? How? When? Where? Super Sleuth knows if you are telling the truth, because it is a precise instrument capable of detecting & measuring changes of activity in your body system (galvanic skin response). Just turn it on and place finger probes on subject. His emotional reaction to questions, sounds & other stimuli is transmitted to his fingers where it is picked up & registered on the finely calibrated meter. You'll enjoy many challenging hours of fun & excitement with the wide variety of games (Reluctant Witness, Deception, Muscle the Meter, etc.) and experiments in the instruction booklet. Complete set features: electronic detector with easy-to-read dial, 9v battery, witness timer, 26-coded game cards & instr. (Recommended for age 10 & up.)

No. 71,836 $15.95 Ppd.

Check Out Ad Claims With Consumer Protection Test Kit

Is the stain remover you're using the best? Does that juice really contain all that Vitamin C? Don't be misled by deceiving ads—find out the truth with this complete, easy-to-use test kit. Everything you need to become a 'Nader Raider": labeled test solutions, test tubes, droppers & complete instr. Tests are for: effectiveness of bleach & stain remover; presence of meat tenderizers; & content of Vitamin C in foods. Simple to do. In just min. you obtain valuable results that make you a wiser shopper. Materials for 5 tests of each. Ages 12 to adult. **No. 71,854 $9.95 Ppd.**

Young Students Need Help Studying The Micro World? This Looks Like A Job For SUPERSCOPE!

- **Only $8.95**
- **Sharp, Clear Picture**
- **Projector**

Why can't anyone come up with a really great student microscope—easy to use, rugged, good quality & low cost? We've asked this question for years & now finally can announce SUPERSCOPE. We've found a virtually unbreakable microscope that's remarkable for such a low price. It's priced like a toy but it isn't. How about micrometer focusing? 30-120X magnification? They're all true and more. This versatile little instrument has been designed to put the fun back in learning. Other valuable features include sturdy plastic base, unbreakable mirror assembly, specimen holding stage, fixed eyepiece with high quality objective, and an additional zoom compounding lens. Great at home or out in the field! Special design lets you observe water drops without slides—no need to worry about batteries, bulbs, or breakage because this scope uses available light. Have a projector or other light source? Just pop out the mirror, insert the included mask, and you've got an amazing micro-projector too! Comes with a 24-pg. instruction & activity guide. All we can say is it's SUPER!

No. 41,983 $8.95 Ppd.

Let Them Make a Mess

Enjoy those messy activities even more by not worrying about nasty clean-up chores. Simply place all the materials in this flexible, rubberized plastic tray and get busy. Schools need no longer fear those fun-filled hours of fingerpainting, pasting, and clay. With the 23 x 23" Work'N Play Tray children contain their mess within the tray and simply wash it off when finished. This versatile 1½" deep tray is great for home use, too. Build model kits & jig-saw puzzles on it; use for cooking preparation, herb garden, or as a drain pan for wet boots; or even for painting or photo chemicals.

Wt. 1½ lb. **No. 80,187 $5.25 Ppd.**

Pkg. of 8 **No. 80,188 $35.00 Ppd.**

Just Arrived! Giant 4" Apollo 17 and Skylab Patches

Beautifully embroidered, colorfast patches commemorating our latest space endeavors. These authorized reproductions of official patches, carry every colorful detail of the originals. The Apollo 17 patch of red, white, blue, and gold, signifies the end of an era. Skylab 1, 2, and 3 are honored with multi-colored patches of beautiful detail. All patches include the names of the participating astronauts. Ideal for decorating jackets, walls, scrapbooks, . . . even as gifts or awards. Take pride in our space achievements—wear the emblems of our astronauts!

$2.35 Ppd. each

Apollo 17 Emblem	**No. 41,968**
Skylab I Emblem	**No. 41,978**
Skylab II Emblem	**No. 41,979**
Skylab III Emblem	**No. 41,980**

Apollo 11-16 Patches, see page 78.

PRICE BREAKTHROUGH!

Ignore Our Previous Prices

Top-Quality Electronic Calculator ONLY

~~$199.50~~
~~$159.50~~
~~$99.50~~
~~$89.50~~

Now Only

WOW! ***$79.95***

What a value! A great buy at $199.50, this fabulous American-made, electronic calculator HAS NOW BEEN REDUCED TO $79.95. The reason . . . technological breakthroughs continue to make it less costly to manufacture. Wait 'til you see this amazing machine . . . instant, silent, time-saving calculations at a price you used to pay for ordinary, old-fashioned adding machines.

Loaded with big machine capabilities and features . . . that anyone can operate with simplicity and ease . . . and at a price every home or office can afford. The first truly personal electronic calculator, great for executives, purchasing agents, research developers, even homework assignments and hobbies. Everyone will want to use it! A lifetime investment because of solid state reliability and modular construction, identical to electronic calculators costing much, much more. It adds, subtracts, multiplies, divides, and does mixed calculations silently (no distracting machine noise), in milliseconds! It has eight digit entry and readout, with floating decimal and calculating capacity. Answers are automatically precise to the decimal. Other features include zero suppression (eliminates superfluous zeros to the left of the result); automatic constant key raises numbers to a power and allows instant multiplication or division by the same number without continued re-entry; minus signal for true credit balance results (enables work with imaginary numbers);+/−sign change key; error correction and a recall memory key. Wt. 3 lb., approx. 6½ x 9 x 2" high. Service if ever needed, is literally a snap with the unique plug-in, plug-out, large scale integrated circuitry. Unconditional 6 mo. guarantee under normal use. Operates on 110-120v AC. Instr. incl.

No. 78,006 $79.95 Ppd.

Note: If, in the meantime the manufacturer enables us to lower the price below $79.95 we will immediately refund the difference at the time we receive your order.

Portable Genius With A Memory . . .

Fits in your pocket like a pack of cigarettes!

The perfect traveling companion to take on the job, in the lab, or anywhere! This lightweight beauty has all the features of larger calculators at one third the size. This marvel of subminiaturization performs all four functions: addition, subtraction, multiplication, and division. It has an 8-digit display capacity and can store the calculated information in its memory. Great for chain and mixed calculations, constant multiplication and division, and true credit balance problems. Streamlined down to a mere 6 oz. and measures only 1 x 3 x 4-1/8". Operates on 4 "C" batteries (incl) and is rechargeable. Even has an AC adapter for added versatility and extensive use.

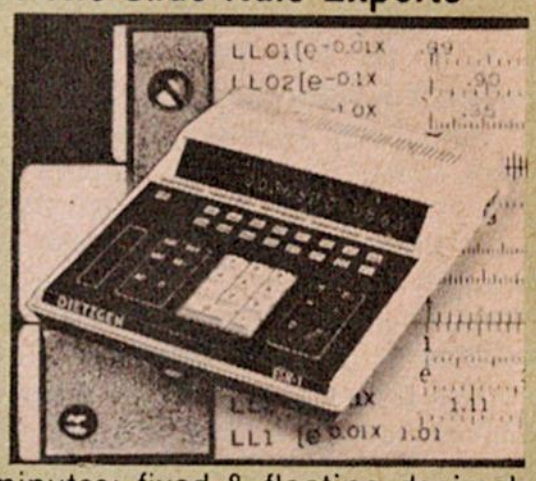
No. 78,009 $89.95 Ppd.

Attention Engineers, Scientists, Surveyors & Researchers

THE BEST ELECTRONIC SLIDE RULE CALCULATOR

Made by DIETZGEN The Slide Rule Experts

~~**Not $675**~~
~~**Not $550**~~
NOW $475



This is the super deluxe slide rule calculator. It does almost everything but clean the kitchen sink. No other slide rule calculator can match it. 12 digit readout; works directly in degrees, seconds, and minutes; fixed & floating decimal; round off; large keyboard; large nixie tube numerals; direct math memory (+ & −); radian degree conversion; hyperbolic functions; both square & cube roots; standard entry (no difficult stacking to learn); desk size 9 x 12 x 3".

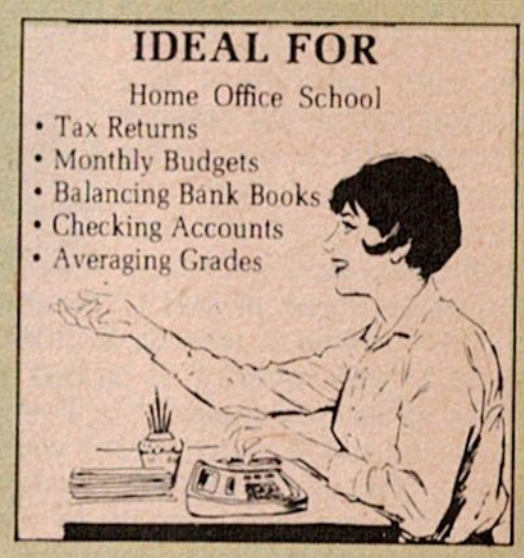
In addition to these exclusive features, you can easily do the more normal functions: sine, cosine, tangent, arc functions, n^{th} power, exponent, natural & common logs . . . everything your slide rule and other calculators can do and more . . . instantaneously.

A fantastic instrument that no engineer, scientist, mathematician or surveyor should be without. It even looks the best . . . slim, sleek extreme high-impact phenolic construction; wt. 5 lb.; uses 110-120v AC. And it carries Dietzgen's unconditional 1-year guarantee under normal use.

A professional tool that pays for itself in time saved and 12 digit accuracy. And it's in stock; no waiting.

Dietzgen ESR-1 Calculator No. 1640 $475.00 Ppd.

Low-Cost Electronic Calculator ONLY $59.95!!



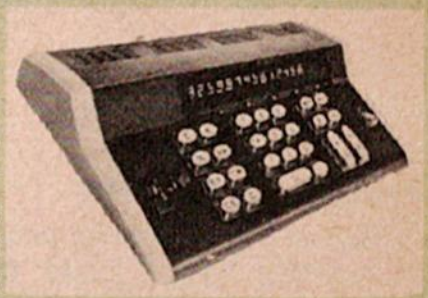
An economy model of the Calculator No. 78,006 (at left) but $20.00 cheaper because it has no memory.

No. 78,008
$59.95 Ppd.

Office Memory Master

SPECIAL SALE

- **12-Digit Display**
- **Now Only $159.50**



The perfect desk top machine for home or office. All the latest concepts in miniature computer architecture are wrapped up in this mighty calculator. Easily handles all major calculator functions instantly and stores desired figures in its memory. To achieve optimum use of the memory register, a large capacity 14 digit readout is included, as well as memory entry and correction keys. Unique features include: % key for percentage assignments; 3 different rounding modes for meaningful answers, round up, down, or 5/4 (5 siginificant figures at 4 places); zero suppression, raises numbers to a power, and constant multiplication and division. Wt. 4 lb. Size 11-3/8 x 7-7/8 x 3".

No. 78,003 $159.50 Ppd.

OPERATE CALCULATORS ANYWHERE, SEE PAGE 75.

Take Pictures Around Corners With The Squintar Lens Attachment

Aim your SLR camera in one direction, click the shutter, and you capture an unsuspecting subject 90° to the left, right, above or below. Now you can get the most natural expressions from children, pets, and people by discreetly photographing them with Squintar. Makes previously impossible nature photography a snap. Capture life in the trees above you; sneak up and snap wildlife at right angles, unaware. Designed to look like a normal lens, Squintar works best with telephoto and lenses of at least 85mm*. Easily attaches to SLR cameras with Series VII adapter rings (available separately). Lightweight (5 oz.), with case and instr.

No. 1932 $25.00 Ppd.

Series VII Adapter Rings **$4.00 Ppd. Each**
46mm **No. 41,937** 49mm **No. 41,938**
52mm **No. 41,939** 55mm **No. 41,940**
*Shorter lenses may cause vignetting.

Unique Multi-Image Mirage Lens

Easily produce the multi-image shots you've seen in all the photo magazines. Simply screw the mirage lens to your SLR camera and this previously difficult process becomes a snap. No need to compensate for exposure and you can use it with either b&w or color film. This unique lens, of faceted glass, produces 5 images in patterns you create by rotating the lens. Makes every shot unusual. All prices postpaid.

46mm **No. 41,921 $22.25** 49mm **No. 41,922 $22.25**
52mm **No. 41,923 $22.25** 55mm **No. 41,924 $22.25**

Polarizing Filter Kills Unsightly Reflections

Since reflections from non-metallic surfaces such as water, glass, or light from blue skies are conditions of polarized light, the use of this polarizing filter controls these reflections and improves your photographs. Just screw the filter directly into the lens or adapter of your SLR camera, adjust the lens opening or shutter speed, and remove glare, haze, and reflection while you increase color saturation. By rotating the filter axis you regulate the intensity of the incoming light to suit subject matter. Filter also used for emphasis of blue sky & cloud effects. All prices postpaid.

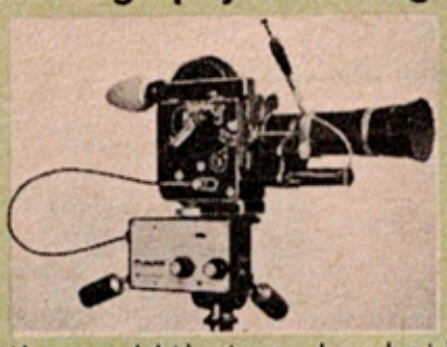
46mm **No. 41,925 $10.25** 49mm **No. 41,926 $11.50**
52mm **No. 41,927 $12.25** 55mm **No. 41,928 $13.50**

Transfer Your Favorite Photos To Any Surface

Add new dimensions to your creative photography with this new transfer process. Make unusual presents. Display your work. Personalize books, rocks, sea shells, lamp shades, wood, even rough or curved surfaces, with your favorite black and white or color photos. Get perfect results every time without darkroom equipment or toxic chemicals. It's easy! Merely coat the print, soak, peel, then mount it to the desired surface. Even works great with pictures from magazines, calendars, art books, etc. Kit contains everything you need for 20-4x5" photos. Instr.

No. 71,819 $5.49 Ppd.

PulsAR—A Breakthrough in Time Lapse Photography at the Right Price!



Now you can convert your photography equipment into a total time-lapse system for filming flower growth, star and planet trackings, cloud patterns, fast-action commercials, traffic flow, time study, surveillance, or anything in the world that can be shot in motion. The PulsAR is a compact, solid-state timing device that controls a motor-driven mechanism (not an unreliable Solenoid), which triggers a 20-in. cable release for single frame exposures. The unit fits all 8, Super 8, and 16mm movie cameras with cable release connectors, as well as, any still camera with spring-driven film advance. Dual controls (calibrated in seconds and minutes) provide the triggering pulse at any time interval from 1/2 sec.-10 min. This lightweight (under 2 lb.), trouble-free instrument replaces previous devices costing up to $900. PulsAR is powered by 4 NiCad batteries (incl.) and easily attaches to camera or tripod with the included bracket. Has battery recharger, guar., and instr. 2 x 3¾x6¼".

No. 1634 $185.00 Ppd.

Create Vignettes With Filter Spot

Produce the popular effect which places the center of shot in sharp focus, entirely surrounded by an off-focus blur. Great for highlighting main subjects. Attaches directly into lens of SLR camera. Best effects by stopping down camera lens to f/8. Instr. incl. All prices postpaid.

46mm **No. 41,933 $7.25** 49mm **No. 41,934 $7.25**
52mm **No. 41,935 $9.00** 55mm **No. 41,936 $9.00**

Pro Starlike Effects With Star Filter

Add shimmering effects to any light source. Enhance night and sunset photography with unique starlike patterns. This glare-free anodized filter easily screws into your SLR camera lens. Enjoy exciting special effects photography! For an even greater effect, stack 2 filters and get an 8-pointed star pattern. All prices postpaid.

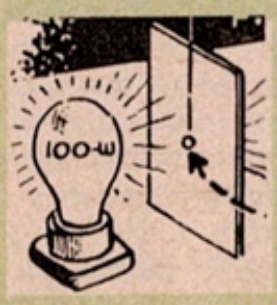
46mm No. 42,004 $7.50 **49mm No. 42,005 $7.50**
52mm No. 42,006 $9.50 **55mm No. 42,007 $9.50**

Low-Cost Pneumatic Shutter Release

This 20" pneumatic bulb and piston release is a must wherever slow shutter speeds are required. The 1¾" dia. bulb allows excellent control without mechanical vibration—still a problem of plunger-cable models. Fits virtually all cameras having standard threaded release sockets. Includes screw-on adapter (required for Leica, Nikon, etc.) and vinyl case.

No. 41,950 $5.90 Ppd.

Completely Revised and Expanded . . . "How to Condense and Project Light"

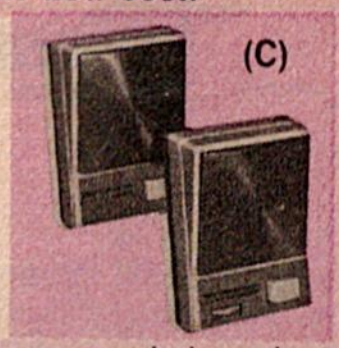


Now, 32 pages of text & diagrams! Describes lamp types; a "light" vocabulary; and chapters on: reflectors, spotlights, fiber optics, collimators & drawing projectors. Even shows how to build a slide projector! Illus.; 8½ x 11"; 32 pp; pprbk.

No. 9044 75¢ Ppd.

Solid State Electronics Kits For Young Experimenters

Easy! Fast! Educational! Useful and Low-Cost!



No technical knowledge or experience needed . . . just a soldering iron, diagonal cutters, pliers, and screwdriver. Each kit includes printed circuit boards, wiring, and step-by-step instructions.

(A) Tune In Exciting 2-Way Police Broadcasts. Your standard AM radio (car or home) can be used to tune in VHF communications band used by police, fire, Civil Defense, etc. Converter operates in 30-50 MH_z band and changes it to lower frequencies a radio can handle. Just place near AM radio—no interconnecting wires needed. 9v battery nec. **No. 41,828 $8.25 Ppd.**

(B) Aircraft Converter Kit. As above, but operates in 108-136 MH_z band allowing you to tune in local aircraft calls. **No. 41,827 $8.25 Ppd.**

(C) 2-Station Intercom Kit. Build a rugged, sensitive intercom system. Great for room-to-room and front door communications or as a baby monitor. Master & Remote stations feature Beep-Tone call signal. Entire system portable for instant communication. All parts incl.: 2½" speakers, 50-ft. cable (with plug-in connectors), 9v battery, and plastic cabinets.

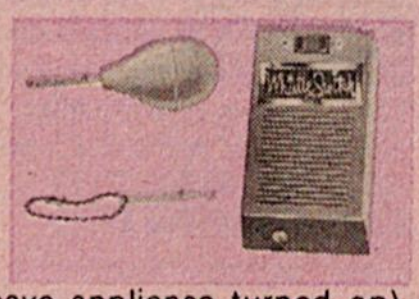
No. 60,951 $11.75 Ppd.

Lightweight Low-Cost Soldering Iron

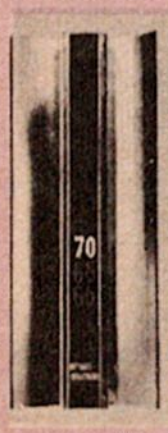
Perfect for hobby kits and general purpose soldering. Tip develops up to 750° F. Stainless steel barrel, long reach, thin, pre-tinned solid copper removable tip. 25w; 8½" long; case incl.

No. 60,970 $3.85 Ppd.

Whistle TV's On & Off



Turn radio and TV receivers, lamps, motor-driven doors on and off without having to get up! Simply plug Whistle Switch® into any 110v standard household outlet. Then, plug any electrical device (leave appliance turned on), up to 300 watts capacity, into the Whistle Switch. Now, just blow or press ultrasonic whistle . . . and your TV, lights, etc. immediately go on. You just sit back and relax. Switch: 2 x 2½ x 4¼". 2 high-frequency whistles and instr. incl. **No. 71,555 $17.25 Ppd.**



Liquid Crystals "Color" The Degrees . . . In A Digital Room Thermometer

Big easy-to-read numerals appear, change color and disappear mysteriously as temps. go up and down. The secret is liquid crystals (microscopic capsules of chemicals activated at certain temps.). Each degree from 62 to 84°F. (in 2° increments) is backed by a pod of liquid crystals that are activated at a specific temp. At other temps. digits appear black. Within each range, the crystals change color, from tan at the low end of the reflective range, to green in mid-range, to blue at the high end. By interpreting colors of the visible digits, readings accurate to 1° and even ½° are possible. Gold anodized aluminum case (5/8 x 3¾ x 9") with wall hanger. Instr. incl. **No. 60,977 $8.50 Ppd.**

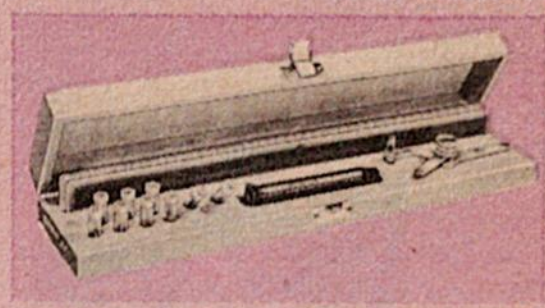
Electronics Lab Kit

Complete Elementary Course In Electronics!

Become an electronics expert & have days of absorbing fun and learning. Over 40 experiments include constructing a pollution tester; rain, lie & spy detectors; police flasher; metronome; Morse code sending device; lemon-powered battery; police & fire signal; and even a 2-transistor radio. You'll learn the function of many of the basic circuit elements used in the home: a light bulb, transistor, resistor, electrolytic capacitor, speaker, diode, etc. No soldering necessary . . . complete snap-fit assembly. Fully illustrated, easy-to-understand manual (8½ x 11"; 80 pp) explains the step-by-step usage of over 100 precision components in this kit. Requires 3 "AA" batteries (not incl.). A great kit for ages 9 & up!

No. 71,861 $12.00 Ppd.

Now Do Professional Lettering Anywhere!



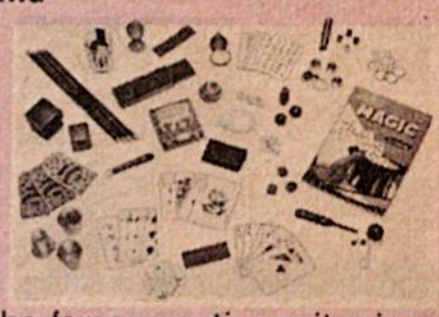
• Fast • Accurate • Easy • Economical

The ideal Lettering Set for students, artists, draftsmen, store clerks, or anyone required to do lettering on charts, posters, layouts, signs, maps, sales presentations, etc. Works with both lead and ink for perfectly uniform letters & numerals. Set features: scriber which easily and quickly changes from vertical to slant; characters arranged so all 3 sizes line up perfectly; 2 templates (letter size #140, 175, & 240), one with upper case letters, other lower case; ink flow accurately regulated by raising or lowering needle; no-skid template-holder eliminates need for straight edges, weights, etc. Set includes: 2 templates; adjustable scriber; metal template holder; 3 pen points; lead holder & leads; sharpener; stylus points; cartridge of black ink; wooden case; and instr.

No. 71,798 $23.25 Ppd.

Deluxe Magic Set For Master Magicians

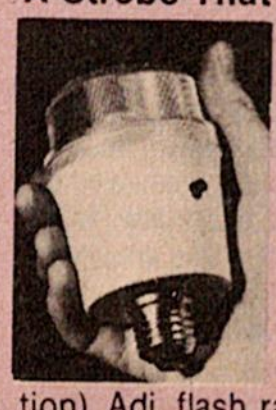
• Mystify With Sleight Of Hand



An extra-large collection of sophisticated magic tricks. You get complete equipment to perform 32 ingenious tricks, plus a detailed book of another 38 super tricks that can be presented with articles generally available in the home. Includes the famous anti-gravity ring, mystic cups, computer dice, magic vision box, and many more. To insure your ABRACADABRAS—a magic wand and complete instructions are included. Get on the road to magical mastery! **No. 71,789 $21.95 Ppd.**

Starter Magic Set. No. 71,173 $12.00 Ppd.

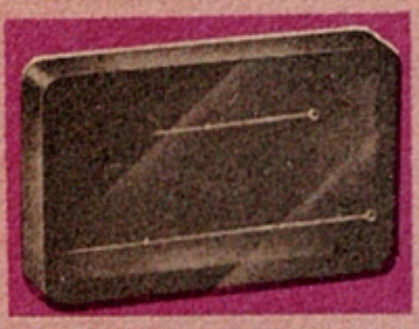
A Strobe That Screws In Anywhere!



The Flashing Strobe is a complete screw-in unit for a regular Edison base! Creates a "fun" party atmosphere, draws attention to store displays, or acts as a warning signal for industrial "hot" spots or construction areas. Convenient because it easily screws in and out of any standard socket, but nowhere near as good as our other strobes (does not stop action). Adj. flash rate from 0-1 flash per sec. Average life: 5 million flashes. Operates on 120v, 60Hz. 5 x 3" dia. approx. **No. 41,913 $27.50 Ppd.**

Replacement Bulb No. 41,918 $4.75 Ppd.

SEE MORE NEW PRODUCTS THROUGHOUT THIS CATALOG.



Embedded Acupuncture Needles

These are the real thing! Actual samples of needles used by acupuncturists throughout the world. Safe because they're permanently embedded in plastic & quite useful for demonstrations or discussions. You get 2 needles (1½" and 2¾") with a written description of type and use. Makes a beautiful and interesting paperweight! **No. 42,014 $4.95 Ppd.**

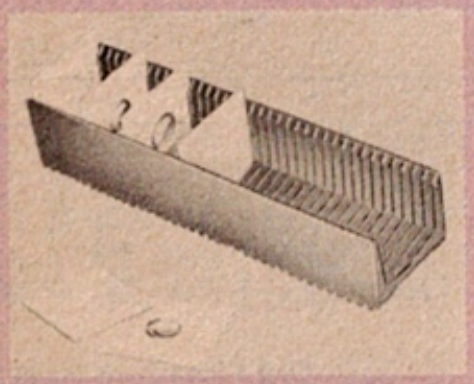
Low-Cost Calibrated Spectrometer

- **Portable Unit**
- **Great For Amateurs**
- **Classroom Uses**

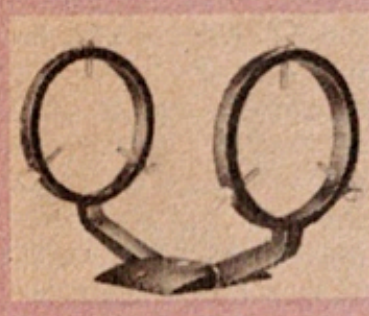
This convenient unit is calibrated to .005 micron at center range and about 3 times that error at the ends. This is close enough for identifying gases in a neon lamp or examining the spectrum of monochromatic lamps (No. 71,780). Compact cardboard case (8 x 3 x 1") includes separate additive filters (blue, green, red) and subtractive filters (cyan, yellow, magenta). Simply hold up to light source and peer into eye aperture.
No. 61,001 $3.95 Ppd.

Portable Mini Optics Lab

- **Demonstrates 7 Optical Devices**
- **Perfect For Elementary Science Studies**



This kit has been developed to teach elementary students and hobbyists the principles of cameras, telescopes, and microscopes. It's so easy—simply mount the lenses, place them in their designated slots of the rack, and view the basic function of each instrument. With the materials provided, you can assemble a Kepler telescope, Galilean telescope, microscope, camera, low and high power magnifiers, and a negative lens assembly. You get 4 lenses, target slide, ground glass, mounting material, slotted 8 x 2 x 2" lab rack, and detailed instr. **No. 60,997 $6.75 ppd.**
Order for the whole class! 10 or more @ $5.75 each.



Universal Ring Mount

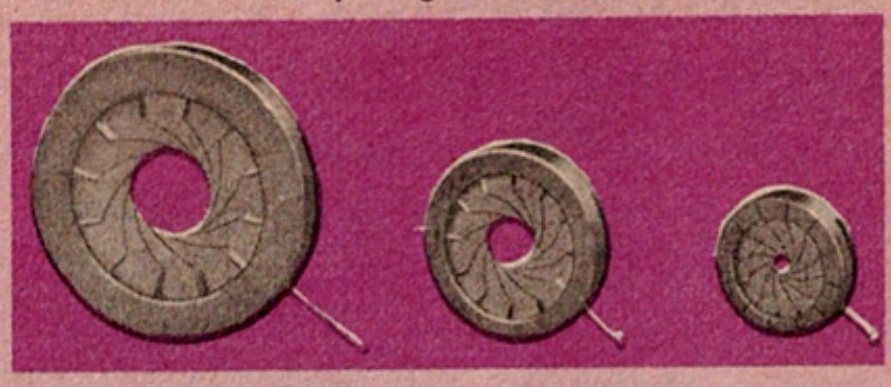
Economical ring mount has 2-7/8" dia. rings spaced 5¾" apart. Each ring contains 3 machine screws 120° apart. Useful in telescope, collimators, laser mounting, optical benches, surface plates, optical instruments or any tubular barreled device. Tapped for ¼-20 post. **No. 71,791 $11.50 Ppd.**

Solartronic Spiral . . .

The Sun's Energy In motion

Easily demonstrates solar energy. When the bright rays of the sun touch the spiral it spins quickly. As long as the sun keeps radiating energy, this demonstrator keeps transforming it into motion. Also works with close proximity to high intensity or 100w incandescent light. Ht.: 12". It's a bit overpriced for its construction, but the best we could find so far **No. 71,790 $13.50 Ppd.**

Precision Iris Diaphragms . . . In Stock



Precision made iris diaphragms in the most commonly required sizes. Iris diaphragms are in short supply & normally require long lead times (see our lower priced diaphragms on page 135). We've had these made for us in England and normally have them in stock for immediate shipment. These are precision made and are designed for instrument use. They can be attached to cameras, enlargers, projectors, illuminators . . . even for O.E.M. uses . . . wherever a variable aperture is necessary. Lever or pin operated, blued spring steel leaves. They operate smoothly in black-finished aluminum mounts.

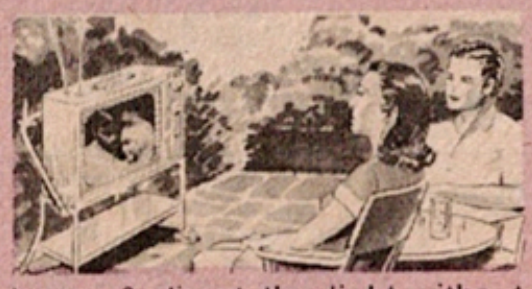
Outside dia.	Aperture Max.	Aperture Min.	Thick (mm)	Stock No.	Price Ppd.
20.5mm (.807")	12mm	0.5mm	6.7	**41,970**	**$13.50**
40mm (1.574")	25mm	1mm	7.5	**41,971**	**17.50**
48mm (1.92")	34mm	2.5mm	10	**41,972***	**22.00**
56mm (2.24")	41mm	3.5mm	11.8	**41,973***	**24.00**
101mm (4.0")	76mm	4.5mm	12.6	**41,974**	**43.75**
155mm (6.0")	110mm	4.5mm	25.5	**60,982**	**59.00**

***Have inside threads, others do not.**

Brass Grommeted Vinyl Apron

Ideal for Gem Cutters & Potters

Your lapidary, ceramic, or lab work will be more enjoyable with protection from this heavy-duty, heat sealed, green, vinyl apron. Thoroughly tested for long wearing ability.
No. 60,999 $3.25 Ppd.

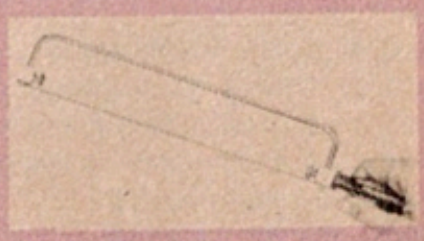


Light Control Film

Eliminate that washed-out look on outdoor TV. Reduce sun glare without blocking view. Shield lamps & direct the light without significantly reducing illumination. Solve these and many more problems involving unwanted light interference with this remarkable .030" thick clear cellulose acetate butyrate Light Control Film. Great for experimenting and O.E.M. Top operating temp., 180°F.

LCF Sheet 12 x 12" No. 71,216 $8.50 Ppd.
LCF Sheet 6 x 6" No. 60,798 $2.50 Ppd.
Quantity Prices? Write our Bob McKelvey.

Lightweight Diamond Wire Saw



Cuts through glass, quartz, rock, stone, crystals and metals (both noble & base). The 45 micron diamond impregnated wire (.008" dia.) is small, yet can turn around a corner leaving a radius as little as .004". Cuts with equal ease on all sides and in both directions. Great for cutting figures: circles, cones, square, triangles, etc. Plastic handle, stainless steel frame. 9" cutting stroke. Wt. 3 oz. **No. 60,973 $9.00 Ppd.**
Pkg. of 5 Replace. Wires. No. P-41,942 $5.00 Ppd.

Complete Tool Section located on pages 125-129.

Heat Pipes . . .

Transfer Heat Easily

- **Save Fuel** • **Ecological**
- **Readily Adaptable To Product Designs**

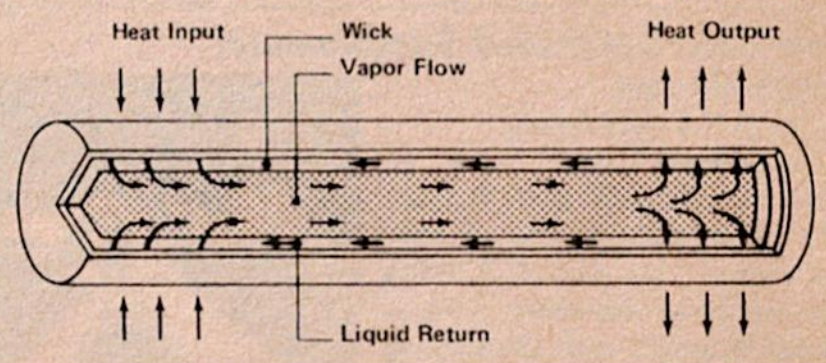
Hundreds of different applications possible when used by schools, laboratories, industry and experimenters. You now can use them to heat or cool gases, liquids or solids. They are sealed, evacuated tubes, lined with a capillary wick, and contain a working fluid. When heated at one end, the fluid boils to a vapor, filling the entire tube in seconds. The vapor condenses back to a liquid when it contacts the cooler wall. The wick returns the liquid to the heated end to complete the cycle. They are so efficient that the temperature differential over entire pipe varies only a few degrees. Heat pipes carry hundreds of times more heat than a solid copper rod. Heat sinks attached to either end makes heat exchange more efficient. Advantages are: low cost installation, automatic unattended temperature control (expels excess heat to appropriate heat sink), noiseless, long life (no moving parts), self-contained (no controls or power source needed) other than heat to be moved.

The use of a heat pipe can, in many instances, remove sufficient heat to eliminate or greatly reduce heat associated problems. For corrosive environments, the heat pipe can be electro-plated, or coated with teflon. With a product as new as this, many varied applications are limited only to your creativity. (See pg. 5 for Edmund's Sizzle Stick—heat pipe that cuts cooking time 30-50%.)

Attention Design Engineers

This product is the one you should not miss out on. The future of heat pipes cannot even be properly guessed in view of their applications for ecological purposes. Heat pipes can conserve, and/or salvage heat, thereby aiding the pollution and energy crisis.

HEAT PIPES ARE CLOSED, EVACUATED CHAMBERS, WHOSE INSIDE WALLS ARE LINED WITH A CAPILLARY WICK, WHICH IS SATURATED WITH A VOLATILE WORKING FLUID.

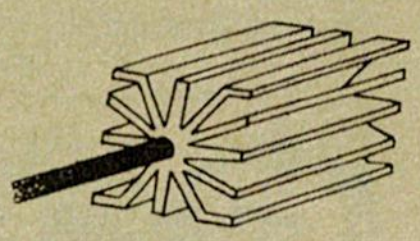


FREE 16 pg. Heat Pipe Idea Book No. 9897. Loaded with ideas on origin, advantages, applications, & suggested uses of thermal transfer. Free with every heat pipe order, and on request. Written by Robert Roth—Thermal Transfer specialist.

(A) Heat Pipe Stock Sizes—Copper Alloy Operating Range: 80-250°C (180-480°F.).

Transfer Cap. in Watts	Dia. & Length	1 each	3-9	10 or more
450	3/8 x 10"	**61,018 $18.50**	**P-71,894 @ $16.60**	**P-71,895 @ $14.95**
310	3/8 x 24	**71,880 26.50**	**P-71,887 @ 23.80**	**P-71,881 @ 21.40**
575	½ x 18	**71,882 25.25**	**P-71,888 @ 22.95**	**P-71,883 @ 20.45**
400	½ x 36	**80,207 34.45**	**P-80,209 @ 31.95**	**P-80,208 @ 28.75**
700	5/8 x 18	**71,884 29.95**	**P-71,889 @ 26.95**	**P-71,885 @ 23.95**

(B) Stainless Steel Heat Pipe—Operates in ranges of 80-300°C. More resistant to corrosive solvents than Copper Heat Pipes. 11 x 3/8".
No. 60,940 $18.25 Ppd.



(C) Extruded Aluminum Heat Sinks

Use on ½" Heat Pipe	Use on 3/8" Heat Pipe
2" **No. 42,040 $3.68**	2" **No. 42,039 $3.68**
4" **No. 42,042 $4.71**	4" **No. 42,041 $4.71**
6" **No. 42,044 $5.98**	6" **No. 42,043 $5.98**

Please write for large quantity orders & unusual sizes.

Heat A Home At No Cost?

Maybe not yet, but "Solar House Plans" by Dr. Harry E. Thomason will give you a good look at how to go about it. Solar-heated homes, cost almost nothing to operate & may well be the economical home for the future. Here are 20 fact-filled pages of text & illustrations on Solar Homes . . . advantages, problems, savings and more . . . 8 oversized pages of basic solar house plans. Plans serve as guidelines for your architect in fitting your space requirements, design ideas and local area building codes. To build house, a license from Dr. Thomason is necessary (see below). Booklet plus 8-pg. plan insert. **No. 9440 $10.00 Ppd.**

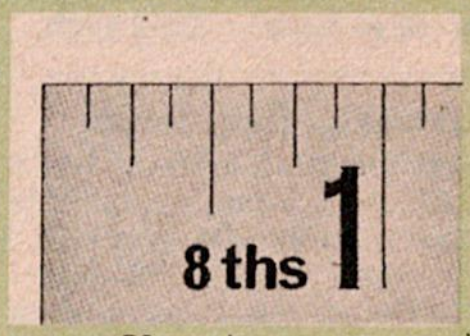
Solar House License—To order, state name & address of site (incl. block & lot #). **No. 9441 $20.00 Ppd.**

Amazing Acrylic Material Conducts Electricity

A 6 x 6 x 1/8" acrylic plastic sheet coated with conductive gold . . . thin enough to see through yet conducts electricity. Make "wireless" clocks, electrical object d'-art, unusual gadgets, etc. Use to conduct power to any device with "invisible wires." **No. 60,945 $12.65 Ppd.**

Enter The World of Macro Photography

With These +20 Close-Up Lenses



• For SLR Cameras

Now you can take extreme close-up photographs with almost any SLR camera and these attachment lenses. Ideal for portrait, nature, and special effects photography. By putting them over a 50mm lens an approximate 1:1 magnification is obtained. On 55mm lenses there is a magnification of slightly over 1:1. No exposure compensation or adjustment is required . . . just put them on like any lens filter. Due to the short distance between subject and camera, depth of field is very shallow, therefore, smallest lens aperture is recommended (at least f/5.6) to achieve maximum depth of field. Polished and heat treated to avoid distortion. Instr. and vinyl case incl.

$11.25 Ppd. Each

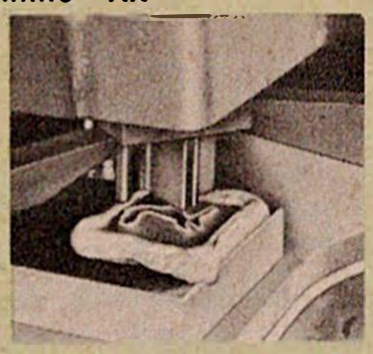
46mm **No. 1933** 52mm **No. 1935**
49mm **No. 1934** 55mm **No. 1936**

Adapter Rings for any unmounted accessories **$4.00 Ppd. Ea.**

46mm **No. 41,937** 52mm **No. 41,939**
49mm **No. 41,938** 55mm **No. 41,940**

COOK WITH SOLAR ENERGY, SEE PAGE 52.

Make Accurate Reproductions in 6 to 8 Minutes With The Rapid-Mix Self-Curing Facsimile® Kit



Facsimile® is a special plastic that sets up hard (6-8 mins.) without dimensional change! Ideal for: transferring threaded and contoured forms; making sample die and mold cavities or replicas of master gages; special "nests" for holding irregularly shaped work for turning, grinding, etc. Indispensable for tool & die rooms; model shops; labs; quality control and maintenance uses. With this kit you have everything you need to cast small run parts and prototypes, make emergency repair parts, quick jigs and fixtures. Duplicates any surface, even 5 microinches or less. Can be machined like metal: drill, mill, tap, grind, shape, sculpt, etc. Kit contains: 1 lb. powder and 120 ml. of liquid for making Facsimile®; 80 ml. of Releasing Agent; dispensers, mixing cups & measurers; and complete instr. **No. 71,796 $21.00 Ppd.**

Miniature Wire Cable Kit

Make your own cable assemblies, fishing leaders, lanyards, control cabling, prototypes, etc., on the spot. Great for model boats, trains, and airplanes. Support large outdoor mobiles or use as light guy wires. Easy to use . . . just cut cable to length, form loop with fitting, and crimp both parts. Fittings provide strong connections equal to breaking test of cable. All wire is multiple strand stainless steel with nylon jacket for protection. Kit includes: crimping tool; 25-ft. of 40 lb. wire (.024" dia.); 25-ft. of 90 lb. wire (.034" dia.); 50 compression fittings; storage box; instr. **No. 41,818 $14.40 Ppd.**

50-ft of 40 lb. wire.	**No. 41,820**	**$6.80 Ppd.**
50-ft. of 90 lb. wire.	**No. 41,821**	**$8.50 Ppd.**
100 fittings for 40 lb. wire.	**No. P-41,822**	**$4.30 Ppd.**
100 fittings for 90 lb. wire.	**No. P-41,823**	**$4.30 Ppd.**

New Spray-On, Non-Stick, Polymer Coating

- **Reduces Friction**
- **Protects Against Corrosion**

Spray a tough, corrosion-resistant, permanent slip film on equipment and tools in two easy steps. Just prepare the surface with the conditioner and cleaner, then spray on the plastic coating. So many uses in home and industry. . . saw blades, garden tools, and files, bearings, controls, fans, screw threads, etc. So durable it even keeps marine hardware and equipment barnacle-free. More slippery than waxes and silicones. Both cleaner and polymer coating in 5.5 oz. aerosol cans; aluminum color; covers 8 sq. ft. Instr. incl.
No. 41,964 $5.75 Ppd.

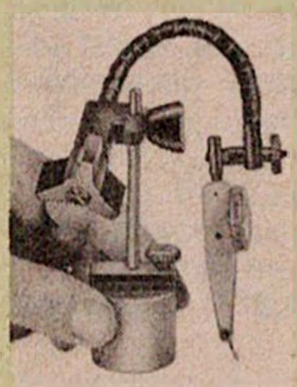
3-Nozzle Flameless Heat Gun

Now you can own a high quality heat gun set at a new low price. This lightweight instrument is great for all your heating chores: shrink fitting tubing; molding plastic; thawing pipes, windshields, even your front porch. Tough, ultra-high impact housing and durable brushless motor make it great for shop use. An air-cooled barrel, with 3 color-coded heat range nozzles, adds to the unit's versatility. Also includes slip-on deflector, pin-point adapter, and 3-conductor grounded cord. Temperature range: 500, 650, and 800° F. 8-7/8" long; 7" high; weighs only 1¾ lb; max. 5.4 amps power. **No. 71,785 $46.50 Ppd.**

Amazing Quik-Freeze Drops Temperature to -50° F. In Seconds

New Quik-Freeze instantly sends a chilling spray to a directed area with the push of a button. Prevents heat transfer during soldering or welding operations. Great for freezing tissue in biological specimens, live insects, or any lab work requiring instant freezing of small areas. Saves time during heat testing and at the same time protects valuable surrounding parts. Isolate faulty electronic components in seconds. Use with standard spray nozzle or attach included 6" extension for confined areas. Comes in 12-oz. aerosol spray can; non-toxic; (can frostbite skin) non-flammable. **No. 60,968 $4.75 Ppd.**

Magnetic Flexible Indicator Holder



Especially designed for use on just about any machine tool, Flexbar swivels, rotates, and then locks at any height, in any position, without backlash. Virtually eliminates the need for a large assortment of rods, swivels, clamps and other hardware. Ideal for model makers and owners of any machines with tight work areas. Comes complete with fine adjuster, heavy-duty magnetic base, and stainless steel solderless cable. Base is 1-1/8 x 1-3/8" dia.; 25-lb. pull. Top clamps up to ½" & swivels 360°. Total height adjusts 8-10". **No. 41,944 $25.75 Ppd.**

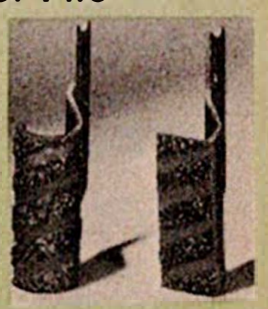
Blast Away Dirt and Paint

Solve your complicated cleaning problems with this versatile Sand Blast Gun. Portable gun is ideal for removing dirt and rust scale as well as texturing and etching metals, glass, ceramics, plastics, etc. Handles 16—1,000 grit size abrasives (silica sand, metal shot, aluminum oxide, etc.) and even blasts liquids for effective liquid cleaning. Siphons liquids directly from drums and tanks using a siphon tube. Air pressure 60-150 psi. Sturdy zinc die cast gun body, 3/16" I.D. diamonite nozzle, hardened steel jet and 1-qt. metal container. Lightweight (3 lb.) and ready to use in plants, labs, etc. Just connect to your air line. **No. 71,786 $32.95 Ppd.**

5X Linen Tester . . . With Movable Indicator

Great for industrial inspection, counting textile threads, examining stamps, printing, engraving. Features movable indicator on base (1" scale with 1/8" divisions); folds flat. 5 power 1-3/32" dia. lens. Opening permits placement of tester/magnifier on object. Sturdy brass construction; black finish. **No. 41, 953 $9.95 Ppd.**

Turn Your Saber Saw Into A Power File

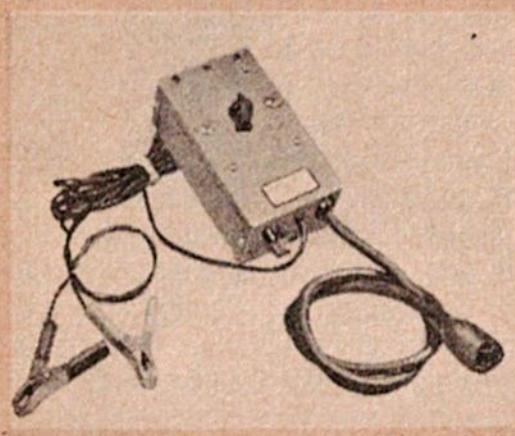


By using your saber saw for muscle and these tungsten carbide files for abrasive, you have an exciting new tool for fast filing, shaping, and refinishing of ceramic tile, asbestos, fiberglass, paneling, rubber, plywood, etc. No more lengthy hand filing or messy sanding. Just choose the round or flat shaped file, slip it into your saw, and make difficult jobs a cinch. Set includes 1 flat and 1 half-round file, helpful hints and instr. Fits most saber saws. Use on metal not recommended. **No. 41,917 $3.50 Ppd.**

Attention Astronomers

NEW BREAKTHROUGH!

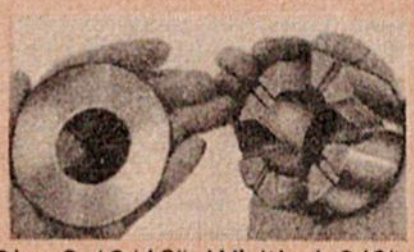
New Edmund Variable-Speed Drive and Slow-Motion Control
Don't Pay $150 or even $89 Only $63.50



At last, a variable-speed drive and slow-motion control at a sensible price. Instantly adjusts to track at sidereal, solar, lunar or planetary rates, plus push-button control of variable rates for precise guidance in astrophotography . . . especially long exposure. Fine for general observing too. Can be used on any electric drive telescope up to and including 8" size. Latest silicon solid-state design; safe, won't harm drive motor. Uses 12 volt D.C., so it's great for portable set-ups. Single self-contained unit only 5¼ x 2-7/8 x 2-1/8", lightweight, sturdy metal cabinet; fused for overload protection. Drives 110v AC synchronous motors up to 12 watts. Output frequency variable from 50-80 Hz.

No. 71,877 $63.50 Ppd.

2 lb. Mighty-Might



A fine quality surplus cylinder magnet with a washer-type keeper. Many uses in home, shop & industry. Made of Alnico VI, this beauty will lift up to 75 lbs. Dia. 2-13/16". Width 1-3/8". Center hole dia: 1-3/8". **No. 42,077 $14.50 Ppd.**

Utility Magnifiers Make Many Jobs Easier

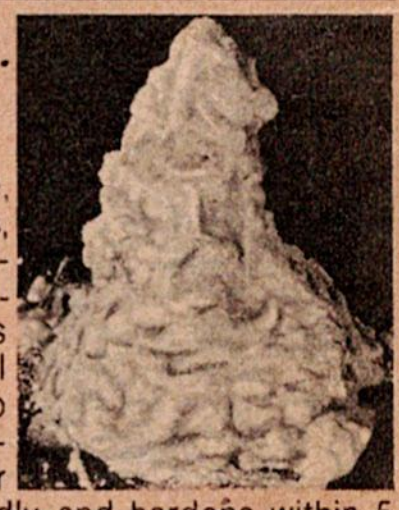
Great for anyone working in graphic arts. Achromatic lenses, rugged construction, aluminum body and wide, sturdy base. Ring lock sets focus for repeated use. Neoprene gaskets seal lens system against moisture & dust. Excellent clarity and sharpness to edge of the wide field. 5X has 3-element lens system, 6X has 4 elements. Both excellent buys. Lens dia. 1-3/8".

5X, Field of view 1¼". **No. 732 $22.50 Ppd.**
6X, Field of view 1-1/8". Recommended for viewing microfilm up to ½ frame 35mm size. **No. 733 $26.50 Ppd.**

FREE For Teachers!

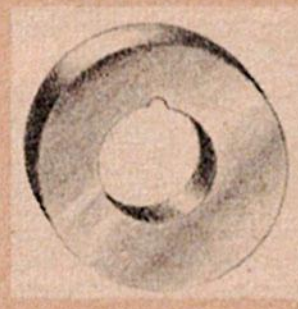
A Helping Hand
Edmund Scientific Co. has been offering materials to make the teacher's job easier for quite some time. Now, to go one step farther, we've written a 32-pg. book of creative Science Activities that's loaded with easy step-by-step lesson plans for effective and interesting science presentations. Written for teachers, by teachers, the book has ideas, materials, advice, and other surprises. It's yours for the asking. Simply request **Bklt. 9896** by mail, on school stationery, and we will rush it out, free of charge.

Super Foam . . .



Expands to A Rigid Mass 30 Times Its Original Volume
Use to seal gaps, insulate, soundproof, fill hollow objects, make model railroad landscapes, science project volcanoes, etc. This liquid resin is simple to use. Pour equal amounts of can A & can B into a container, stir for 25 seconds, and pour, spread or mold the mixture. Forms rapidly and hardens within 5 minutes. Can be used in plastic molds, then carved, painted, sanded, or perforated. Complete instructions incl. for reproducing picture frames, plaques, figurines, etc. If given space, foam rapidly expands to 30 times its original volume. When hardened, becomes rigid, lightweight, waterproof, heat and cold resistant, erosion-proof, and buoyant brownish mass. Two 16 oz. cans make up to 20 square ft. Equal by volume to 150 lb. plaster. Works best at room temperature.

2 can set. No. 71,876 $6.95 Ppd.
24 can set. No. P-80,206 $65.00 Ppd.



Unusual Magnet

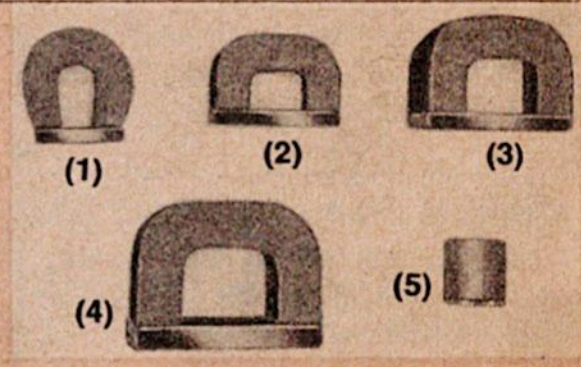
Sintered Alnico Ring Magnet (Isocotropic Lodex 42) that is magnetized across its diameter! Designed for the permanent magnet fields of small motors. Similar magnet effects of a bar magnet except with closed structure. Has north and south pole on its diameter. Lifting power ½ lb. 1" dia., 5/32" thick, ¼" hole. **Pkg. of 8 No. P-40,846 $2.00 Ppd.**

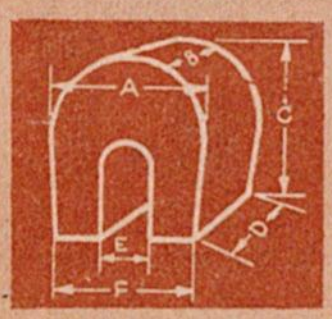
See full selection of magnets, pp. 34-36.

Pocket-Size Imported Magnets

• Powerful • Small Size • Colorful

One of the strongest, pocket size, permanent type, magnets we've seen. Alcomax is similar to Alnico (aluminum, nickel, cobalt, plus iron) but more modern and many times more efficient. You'll find hundreds of uses for these handy and attractive magnets in the home, school, shop, office & lab. They're perfect for bulletin boards, pick-up tools and experimenting. Your choice of horseshoe, power or pot type; each have a bright red finish and a plated keeper. Imported from England.





	Wt. (Oz.)	Magnet Size (Inches) (A)	(B)	(C)	(D)	(E)	(F)	Pull (Lb.)	Avg. Gauss	Comments	No.	Price
(1)	1	1-3/32	5/16	1	5/16	¼	7/8	4	1400	Alnico V; U-Shaped	41,946	$1.25
(2)	2½	1-5/32	¾	¾	¾	9/16	1-3/16	6	1600	Alcomax; U-Shaped	41,947	2.25
(3)	5	1½	1	1	1	¾	1½	15	2300	Alcomax; U-Shaped	41,948	3.70
(4)	8	1¾	1-1/8	1-1/8	1-1/8	7/8	1¾	25	2600	Alcomax; U-Shaped	41,949	5.00
(5)	1⅔	Ht.: ¾"	Dia.: 13/16					5	1500	Alcomax; Pot; tapped	41,952	1.80

Convertible Binocular Microscope

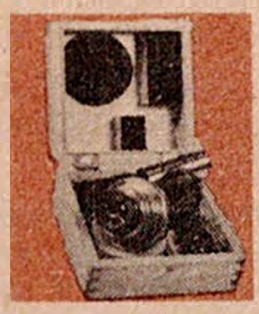
"Possibly our greatest bonanza purchase!" Amazing convertible microscope features a massive arm with large slide surfaces to carry the reversible and interchangeable bodies always parallel to the horizontal stage, eliminating wet-mount spillage, minimizes shake and vibration, allows optimum wide-field photo-micrographic and projection work. New . . . unused!

Solidly built body and base (illus.), it features: 4 objective turret with powers to 1500X; paired eyepieces; removable interchangeable head with interpupilary fine adjustment from 55 to 70mm (incl. right eye individual focus); calibrated graduated X-Y mechanical stage; both coarse (by back-geared diagonal cut rack and pinion with lock and tension knob) and fine focusing; condenser N. A. 1.25 with adjustable rack and pinion, and iris diaphragm; substage mirror; plus hundreds of other features. Incl.: hardwood carrying case with drawer. Stands 13" high extended x 8" x 6". Shpg. Wt. 20-lbs.

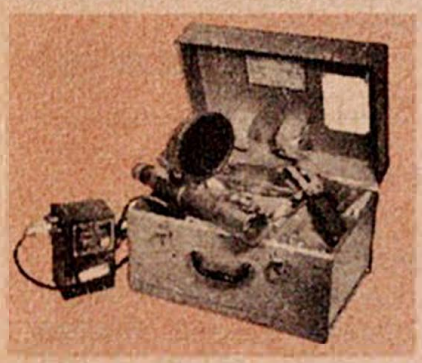
No. 85,224 $410.00 T.C.C.

Surplus Stereo Microscope, see page 86.

3D Microscope Condenser . . . 1/3 Off!



Now, get the same central field illumination as with the Abbe condenser. Add better density, clarity, and depth of field to your speciments by establishing a "plastic" visual field, transilluminated with combined light rays. This lighting method also eliminates shadows and improves color fidelity for greater detail of microscopic surface areas. Contains an aplanatic lens system having an optical correction equal to high resolution objectives. Condenser mount incorporates a calibrated iris diaphragm, filter holder, and condenser-centering adjustment screw. Removable front lens with numerical apertures of 1.2, 0.8, 1.25, 0.65. Incl. 3 glass filters and hardwood storage box. Fits any binocular or monocular microscope operating with transmitted light having an aperture for 39.5mm dia. substage condenser **39.5mm. No. 71,716 $99.50 Ppd.**



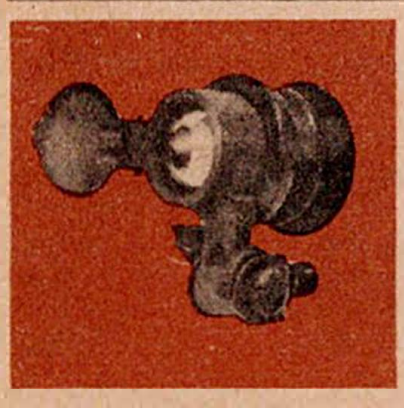
"See In Total Darkness" With Army Sniperscope!

Army model M3 used for crime detection, painting forgery identification, mineralogy, research labs. For power source use our Ni-Cd batteries (pg. 93) or 6v car battery. Telescope 16¾" long, lens 50.4mm dia. Incl. 5" dia. filter. Electrostatically adjusting focus; knob also adjusts reticle intensity, vertical, and horizontal. Power pack incl. 6v input, 20,000v output, plus power for either Farnsworth #6032 or RCA-A6676 image tube. Unit incl. steel carbine bracket and pistol grip handle with switch control. 7½ x 4¾ x 3-7/8"; shoulder strap, 5-compartment carrying case incl. Shpg. wt. 29 lbs. **No. 85,157 $325.00 T.C.C.**

Hand Held Sugar Refractometer

Small hand held (approx. 7¼" x 1¼" dia.), with focusing eyepiece. German-made. Measure the refractive index of liquids containing sugar. Measures 0 to 63% concentration of sugar in liquid. Easy to read. In leather case. Shpg. wt. 0.8 lbs.

No. 60,964 $100.00 Ppd.

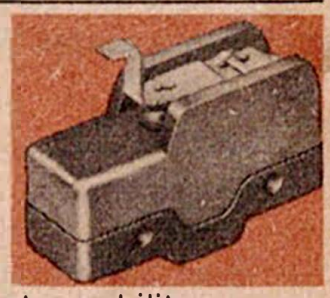


Bazooka Gunsight

This is the sight from the famous Bazooka. Reticle pattern (illus.) appears to rest directly on target whether object is yard or mile from eye. Can be used as Newtonian Ring Sight. There is no parallax.

No. 50,131 $6.50 Ppd.

Heavy-Duty Microswitches



Use in home or shop automating—safety controls, counters, alarms, & limit switches. For normally open operation, but third terminal available for closed use. Small differential, snap action, with stainless steel lever arm, provides high current capability.

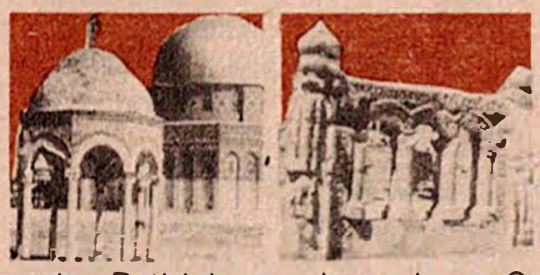
Type B. Only 2.5 oz. max. actuating force, controls 10 amp at up to 250v AC, or 12v DC.

Set of 2 No. P-41,421 $1.75 Ppd.

Type A. Operating pin has silicone rubber seal. Requires 9 to 14 oz. actuating force. Rated at 20 amp up to 250v AC, or 10 amp at 12v DC.

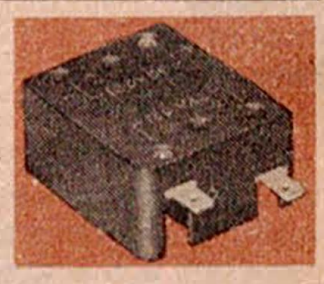
Set of 2 No. P-41,420 $1.95 Ppd.

Terrific Surplus Bargain! 288 Slides of the Holy Land



A $72.00 Value For Only $31.50! Limited supply! A fantastic selection of 288 beautiful color slides featuring Mount Tabor, Nazareth, Bethlehem, Jerusalem, Cana, Ancient Jericho, Ashkelon Antiquities, Mount Carmel, Haifa, Caesarea, Masada, Ancient Avdat, Safad, Ancient Megiddo, Capernaum, Upper Galilee, the Dead Sea, and Ancient Beth Shaan. This amazing buy is ideal for church groups, archaeology clubs, and colleges offering biblical, ancient civilization, and art courses. 288 labeled 35mm slides. **No. P-71,837 $31.50 Ppd.**

Full-Wave Rectifier Circuit Bridges

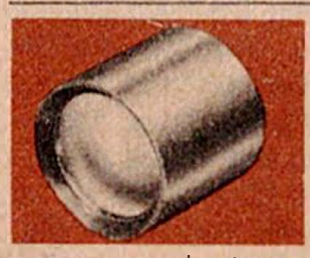


Well built, easily mounted & completely insulated! Use with transformer for quick DC source. Ideal for model railroads, operating DC relays, solenoids, etc. Size: ¾ x 1¼ x 1½". Max. AC input 120v; max. DC current 2 amps. Wt. 1 oz. Pkg. of 2. **No. P-41,749 $2.50 Ppd.**

Surplus 4-Digit Electric Counter

Counts items, events, etc., during a day, hour, or whatever period it is connected for. 115v AC non-reset type. Panel mount with (2) 12" leads. 1¾ x 2¾ x 2½".

No. 41,495 $3.95 Ppd.

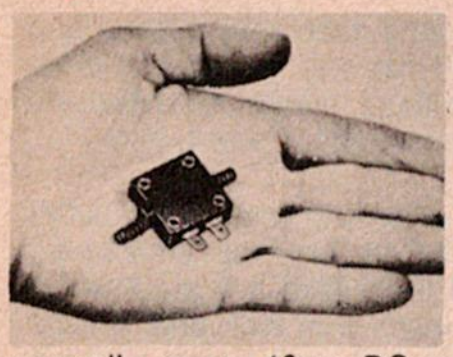


Surplus Closeout Copy Lens

Anastigmat Tessar type for enlarging, projecting & copy work. Black metal barrel. 6" F.L., F/7, precision coated optics; extremely flat field. Ideally used for overhead and opaque projectors. Exceptional value at this low price. Limited quantities.

No. 41,982 $12.50 Ppd.

Super Sensitive Pressure Switch

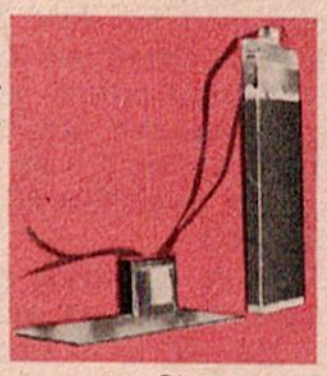


Bargain . . .
Original Cost $11.50 . . .
Now Only $4.50

Manufacturer's surplus switch operates on pressure differences between ports . . . on only 0.02psi air, or ½" or less of water pressure. Single pole, normally open, 10ma DC contract rating, 30v AC/DC (usual loads require sensitive relay or solid state control). Many industrial uses, in research labs, and for fine hobby activities . . . as a sensor, control, switch, counter, vane type flow switch, detect loss of edge, etc. 1" sq. polycarbonate case plus 3/16" dia. barbed ports, wt. 10g.

No. 41,623 $4.50 Ppd.
10 or more @ $3.95 Ppd.

Surplus Battery Charger-Only $1.00!

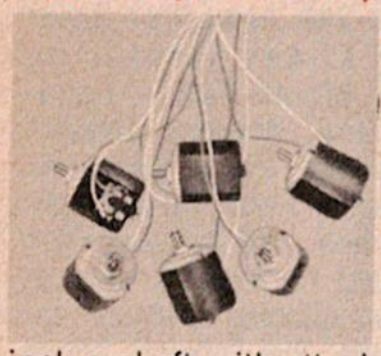


This compact, surplus charger consists of a stepdown transformer and solid state diode wrapped inside. Simple, yet perfect for recharging flashlight batteries and Ni Cad cells. Strong enough to run small electric motors and models. Comes with 4 leads and instr.

Amps	Volts	Charge
.096	1.4	1 NiCad cell
.080	2.8	2 NiCad cells
.056	5.2	4 NiCad cells

(Indust. inquiries invit.) **No. 41,961 $1.00 Ppd.**

MOTORS, MOTORS, MOTORS . . .

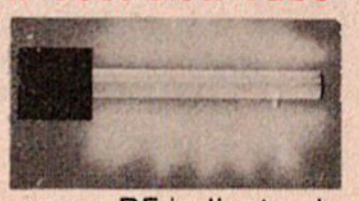


Surplus Bargain Packs

Is this for real? $1.00 DC motors for as little as 21¢ each? You'd better believe it! We've discovered 97,000 of these high quality motors with big 13" color coded leads that run on a single flashlight battery (not incl.) from 1.5-4.5v. Even incl. a shaft with attached small gear head. A tremendous bargain with so many uses at home, school, or business.

Pack of 12 No. P-60,985 $3.00 Ppd.
Pack of 24 No. P-71,826 $5.00 Ppd.

Test High Voltage With A Low-Cost Glow Tube



Surplus buy! German-made sealed glass tubes are filled with neon gas and coated with green phosphor that glows in the presence of high voltage. Great for testing spark plugs, TV voltage or as an RF indicator in radios. Touch it to your device, if it glows, normal high voltage is present, no glow means a short. 3" long; black plastic base. Instr. **No. 41,912 $1.25 Ppd.**

High-Grade, Heavy-Duty Transformer

• Surplus Buy • 3 to 8 Volts

This 100-115v adjustable transformer is ideal for controlling the light source in Foucault testers, Ronchi grating testers, or any other optical tester with low-voltage illumination. Operates on 50 or 60 c/s and has a switch to control voltage from 3-8v in 1v steps (rated 2.5 amps). Complete with two .154" dia. jacks and special Nikon® microscope accessory connector. **No. 41,969 $12.50 Ppd.**

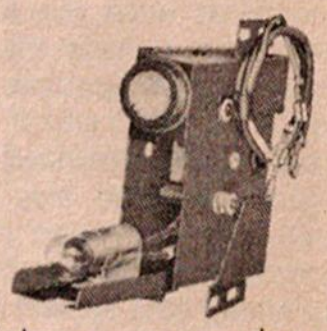
Hear Goldfish Gossip And Lobsters Laugh

• Hydrophone . . . underwater mike
• Surplus Bargain . . . Only $5.00

Make a "fish finder" or a "splash alarm" for your swimming pool. Listen to dolphins talk . . . add sound to underwater movies. Great for skin divers, experiments, science projects, etc. Built to stringent gov't. standards, this Hydrophone can be used with both high and low impedance amplifiers and tape recorders. Rubber cased; fungus and shock resistant. Frequency response: 10-6,000 Hz. Working depth to 300 ft. Minimum sensitivity 1,000 Hz at depths of 60 or 300 ft. Operating temp. range: 0 to 35° C. Leads (approx. 8" long) and instr. incl. Wt. 2 oz. Cable not incl.

No. 41,759 $5.00 Ppd.

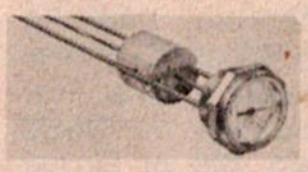
AVAILABLE AGAIN! SURPLUS, SELF-CONTAINED PHOTOCELL RELAY SYSTEM



This item's tremendous popularity exhausted our supply . . .
Now, it's back again.

Easily adapted to operate burglar alarms; counters for people, cars or conveyor packages; annunciators; garage door openers; streetlight controls; various warning systems; assembly-line controls, etc. Manufacturer's surplus, these photocell relay systems were built for expensive copying machines. Unit includes cadmium sulfide photocell, single-pole double-throw relay, silicon rectifier, capacitor, resistor, 6.5-volt lamp, and 75-watt 125-volt socket (U.L. approved). Operates on 110-volt AC. Housed in 1-1/8" x 3-3/8" x 3¾" metal case. Weighs 11½ oz. Instructions for most applications incl.

No. 60,662 $6.00 Ppd.



Liquid Level Tank Gauge

Surplus . . . Built to Military Specs . . . Originally $8.50

Use in oil, fuel, water & mild chemical solution tanks. Die cast, sealed against leakage, with magnetically coupled indicator arrow & dial marked in ¼"s from E to F. Standard 1½" iron pipe male thread, 1-7/8" dia., 11½ threads/inch. Full depth into tank: 11½"; treated, sealed cork float w/8½" travel distance. Interior: brass & stainless steel. Easy to install. **No. 71,419 $2.50 Ppd.**

High Quality 8mm Movie Camera Lens

12.5mm F.L. High quality, coated optics, versatile. Iris diaphragm opens from f/2.7 to f/22. Maximum length 1". Maximum diameter 1.025". Mounting thread dia. 5/8", 32 tpi. A real bargain! **No. 41,146 $9.50 Ppd.**

For complete photographic equipment, lenses, tripods, remote control units, etc., see pages 118-123.

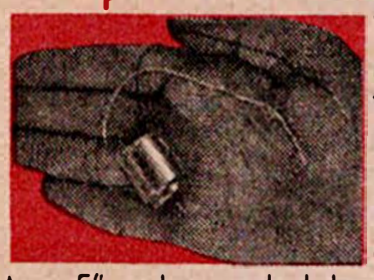
Lab Thermometers

Partial immersion; white background; mercury in glass.
Each $3.00 Ppd.

Stock No.	Range	Graduated	Length (mm)
71,774	70-440°F	Every 2°F	625
71,776	30-100°C	Every 1°C	300
71,775	30-110°C	Every 1°C	300
71,777*	65-85°C	Every 1°C	300

(*Nitrogen filled)

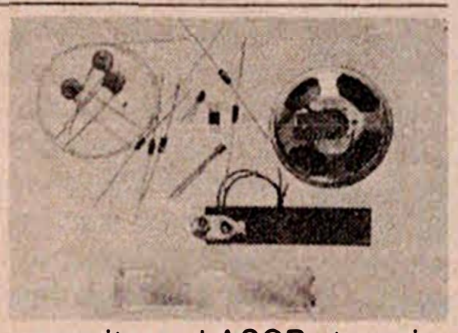
Surplus Motor Bonanza . . . 6 For $3.00



We've found 30,000 of them, made a good buy, and offer them at a low, low price. Six 1½—3v DC motors that run on 1 or 2 flashlight batteries. Each measures 1½" long x 0.825" in dia.; .075 dia. shaft, 5/16" long; two 5" color coded leads. Good for experiments, science fair projects, Rube Goldberg devices, etc.

Pkg. of 6 **No. P-41,965 $3.00 Ppd.**

IR Sensor Alarm Kit



Assemble & wire your own infrared sensor alarm with this battery-operated kit. Highly sensitive. Kit incl.: speaker; perforated board; battery clip & holder; 24" long plastic fiber optic light guide w:IR filter; resistors; capacitors; LASCR; transistor NPN; & instr. Requires 4 AA cells (not incl.).

No. 41,595 $7.95 Ppd.

Surplus Forceps . . . Two Handy Sizes

Here are two heavy duty forceps of stainless steel with corrugated grips and tips. Great for dissecting, slide pick-up, or even stamp collectors. Don't pass up this bargain . . . buy both sizes!

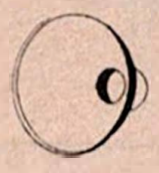
5½" Forceps **No. 60,965 $2.50 Ppd.**

6" Med. Pt. Forceps **No. 60,966 $2.50 Ppd.**

Mounted Anastigmat Projection Lens

A fine quality, compact f/3.0 lens with 3" F.L.; coated; 1¼' O.D.; spiral threaded barrel. Length 1-1/8". Large quantities available. **No. 30,234 $7.50 Ppd.**

Surplus Parabolic Reflector



7½" dia.; 1⅝" I.D. center hole; 3" deep; polished alum. (Alzac process.)

No. 71,224 $2.95 Ppd.

Discontinued & Over-Stocked Items

Every once in a while we find that we have an overabundance of items that either did not sell well in the catalog or that have been discontinued. We are now offering these to you on a 1st come, 1st served basis at the following low costs.

Long-life DAH Projector Lamp. Replaces DEK in Kodak Carousel® **No. 41,543 Was $7.75 Ppd. Now $4.95 Ppd.**

Magic Designer "Toy" draws over 1,000,000 artistic designs. Great fun for youngsters & art students alike. **No. 70,253 Was $4.95 Ppd. Now $2.75 Ppd.**

Refill Paper for Magic Designer (above). **No. 60,097 Was $1.00 Ppd. Now 55¢ Ppd.**

Reflective Glass Beads similar to those used to reflectorize highway signs. Perfect for decorating craft uses. 1 lb. **No. 60,746 Was $2.25 Ppd. Now $1.50 Ppd.**

Twice Around Thermometer. Measures from -50 to +230° F. Perfect for measuring temps. of unknown range. **No. 60,701 Was $15.00 Ppd. Now $6.95 Ppd.**

Optics Cleaning Kit for absolutely lint-free cleaning! **No. 41,291 Was $6.00 Ppd. Now $2.95 Ppd.**

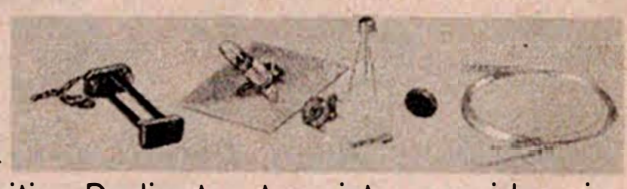
Photoconductor Kit . . . build electric eye devices that perform like magic. Instr. for 19 projects incl. **No. 60,441 Was $10.45 Ppd. Now $6.95 Ppd.**

Albert the Bobbing Bird a fun-filled science demonstrator. Bobs his head into a glass of water. 6" high. **No. 60,264 Was $1.00 Ppd. Now 75¢ Ppd.**

A Super Buy! Complete M-17 Kellner Eyepiece

Probably the finest Kellner ever made for military use (M-17 elbow scope). We made a rare find and offer you this classic Kellner at a bargain price. They give very good definition and are suitable for almost any scope. 28mm F.L., 22 mm eye relief, 22 mm dia. eye lens, 29.5mm dia. field lens. Mount 33 mm x 37mm dia. Has diopter scale and focusing arrangement. Get 'em while they last. **No. 5205 $21.50 Ppd.**

Light "Spy" Kit

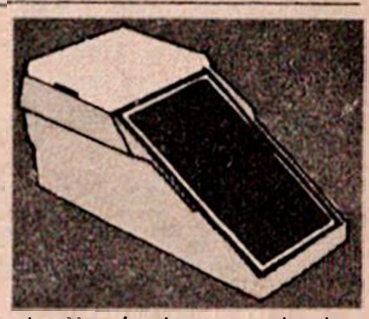


Detect low light levels! Amplification from sensitive Darlington transistor provides signal to activate an incandescent lamp in presence of infrared or visual illumination. Adj. sensitivity. Remote detector uses plastic fiber-optics light guide incl. instr. **No.41,596 $6.50 Ppd.**

Flat Front Surface Mirror

Flat to ½ wave length tolerance. Aluminized and overcoated. Size: 3-3/4 x 2-13/16 x 17/32" thick. **No. 41,999 $10.00 Ppd.**

Heat Water With Solar Energy



This solar water heater increases the temp. of 4 gal. of water up to 30°F. in less than 7 hrs. No fires to build or fuel to use. Lightweight (1 lb.); made of foamed polystyrene with a "mylar" window and aluminum heat exchange plate. Overall size approx. 24 x 12 x 11". Instr. incl. **No. 71,722 $9.75 Ppd.**

Fabulous Collector's Items!

Microscope Slides From The World Famous German Collection of J.D. Möller

We've uncovered a fantastic collection of 36,000 prepared microscope slides. The selection consists of unique, high quality slides by J.D. Möller, medical, histology, diatom test & type, plant & textile slides.

The J.D. Möller Company was reknowned for high quality microscope slides in Germany for many yrs. Established in 1864 in Wedel Holstein, the company survived through World War II & finally sold to a New York firm in the 50's. All of the Möller slides are at least 20 yrs. old making them rare examples of workmanship, unavailable in the market today. We've compared them against the best modern American slides & found the detail far superior even though the stains are not as fresh. One interesting facet of authenticity is the use of greenish or "half-white" mounting glass on a portion of these slides. It seems that in the early 1900's the glass was considered less corrosive prone but had rough edges. We have also noticed the slides developed during the years of World War I & II are of this green glass indicating its use, not by choice, was a result of the harnassing of German industry toward the war efforts & this "rough" glass was the only available.

The test slides although not of the Möller name are possibly by his successors. They're in excellent condition and have amazing details.

Test & Type Slides **No. 42,078 $10.00 Ppd.**

J.D. Möller (high-quality white) **No. 42,079 $7.50 Ppd.**

J.D. Möller (high-white rough) **No. 42,080 $5.00 Ppd.**

EDUCATIONAL VISUAL AIDS

Super Slides . . . They're Out Of This World!

After all the favorable comments we've received about our space slides, we just had to find more. This time we've really done it! These authentic slides (20 per set), taken from our most successful space missions, add unmatched realism to classroom presentations in social studies, geography, geology, meteorology, even physics classes. Most are in color and have **detailed descriptions included** . . . all are bargain priced. Future sets now being developed include ecology, animals, planets, etc. Any others you would like to see? Let us know.

Egypt, the Red Sea Israel

Subtropical Jetstream

Ganges River & Himalayas

Our World From Space

• Living Maps • Atmospheric Conditions • Land Topography

These sets contain choice color photography from Gemini and Apollo missions as they scanned the Earth from outer space. A special selection of color super slides with detailed information of location and significance to help studies of weather, social studies, geology, earth science, geography, etc. **$5.95 ea. Ppd.**

(A) Earth Views From Afar—A general set showing the Earth and its various atmospheric conditions. Includes familiar sites like Cape Kennedy, Mt. Everest, Red Sea, etc. Also storm types. **No. P-41,910**

(B) Meteorology Above The Clouds—Close examination and analysis of: the jet stream, cloud eddies, sea-breeze phenomena, thunderstorm development, even a raging typhoon. Great for all levels. **No. P-42,003**

(C) Above The Face Of The Earth—Shows major geographical and geological features around the globe. Great views include mountain ranges, valleys, deserts, coastlines, cities, etc. Breathtaking! **No. P-42,002**

Hop Aboard The Apollo Moon Missions

Relive these exciting flights right in your classroom. See in vivid color and well defined detail the most superb highlights of space history. Each set takes you from lift-off to splash-down and has a full teaching guide to fill in the action. All 35mm super slide size.

Aldrin with U.S. Flag on Moon

Mt Hadley 3 Miles High

Earth Rise From Moon

(D) Apollo 11—See Neil Armstrong take that "giant step"; watch the planting of the American flag; examine a moon rock; study footprints. **No. P-41,260 $5.95 Ppd.**

(E) Before And After Apollo 11—A great collection of Apollo 9, 10, 12, 14, & 16 including Earthrise, Hadley Rille, craters, etc. **No. P-41,911 $5.95 Ppd.**

(F) Apollo 17—Farewell To The Moon—The final moon mission and the best photos from the lunar surface. Set has the spectacular night launch, the damaged Rover, huge boulders, last shot on moon's surface, landing site, etc. **No. P-41,977 $5.75 Ppd.**

Bonus Attraction!

Super 8mm Color Films—200 ft. with subtitles.

Apollo	Stock No.	Apollo	Stock No.
11	41,475	15	41,625
12	41,477	16	41,872
14	41,479	**Only $15.95 Ppd. Each**	

Deep Canyons in Noctis Lacus

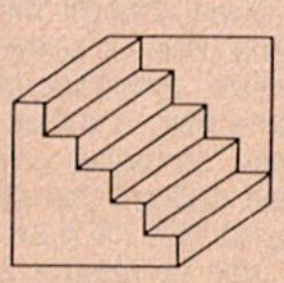
Nix Olympica—15 miles high

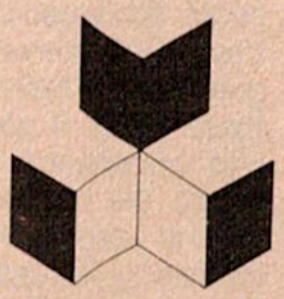
Travel Aboard Mariner 9 For A Good View Of Mars

This bonus set is straight from our unmanned Mariner mission. Incredible black and white photos show vivid detail of this mystery planet in our solar system. See the spectacular Martian landscape, including Nix Olympica, a 15-mile high volcano. Super slide size reveals amazing detail of the North Polar cap, possible river valleys, and even the moons of Mars. A real collector's item we're proud to present. Comes with complete guide.

No. 42,027 $5.95 Ppd.

Unique Optical Illusions Kit . . . 25 Illusions



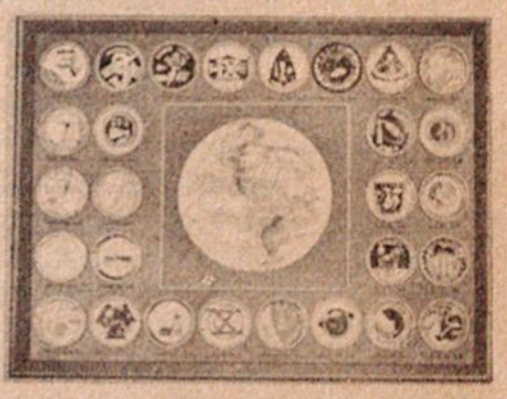


Page size copies of the classical optical illusions at a popular price. The most complete collection of optical illusions and impossible figures ever assembled for display use. Shröder's Staircase, Zöllner's Illusion, Oscillating Figures, Müller-Lyer's Illusion, perception illusions, and more. Complete instructions categorize and explain each illusion and give a brief historical background on transactual psychology. 8½ x 11" each.

No. 71,728 $10.00 Ppd.

Motorized Optical Illusions, see page 92.

Manned Space Flight Plaque



America's manned space program on a commemorative plaque giving a historic record of a series of space missions in which man realized his dream. Your distinctive 20 x 15" moon plaque contains the authentic insignias of each flight telling the full story of our country's greatest moments. From Project Mercury to Project Apollo—28 flights in all. A truly decorative, eloquent, historical record of man's space conquest to be treasured and admired for years to come. **No. 71,855 $16.50 Ppd.**

Classroom Science Chart Assortment

• Informative • Cover most major areas • Great for classroom use

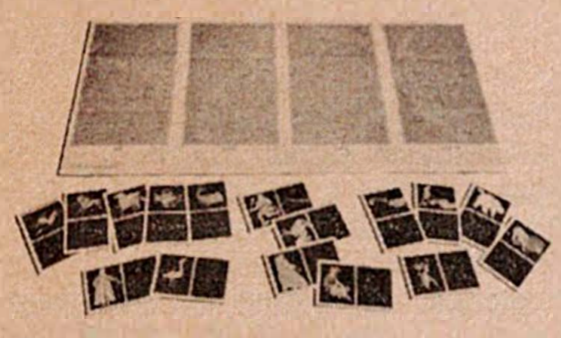
We searched far and wide to gather the best charts available in the major areas of science. Here is a set of brilliantly detailed, accurate visual aids for enhancing every classroom science lesson from elementary school through college. The set includes: (1) Oceanography—a 39 x 29" full color chart that vividly pictures the ocean floor and explains Continental Drift, Beaufort Scale, currents, physical data, tides, landmarks, etc. (2) Solar System—a 24 x 36" full color display showing the planets in relative sizes, their orbits and vital statistics. (3) Heavens—18 x 37" full color chart of the stars of Fall. Winter. Spring. Summer. with tables and information on the reverse side. (4) Weather—22½ x 17½" full color array showing photos of 35 cloud conditions with related weather forecast information. (5)

World Map—50 x 38" full color map with physical features. (6) Set of 8 Physiology Drawings—9 x 12" accurate, concise drawings covering the digestive tract, heart, circulation, eye, ear, brain, with 12 x 30" skeleton chart. So many uses for everybody. Even great for hanging up at home. They're beautiful!

No. 71,842 $8.95 Ppd.

Study The Stars . . .

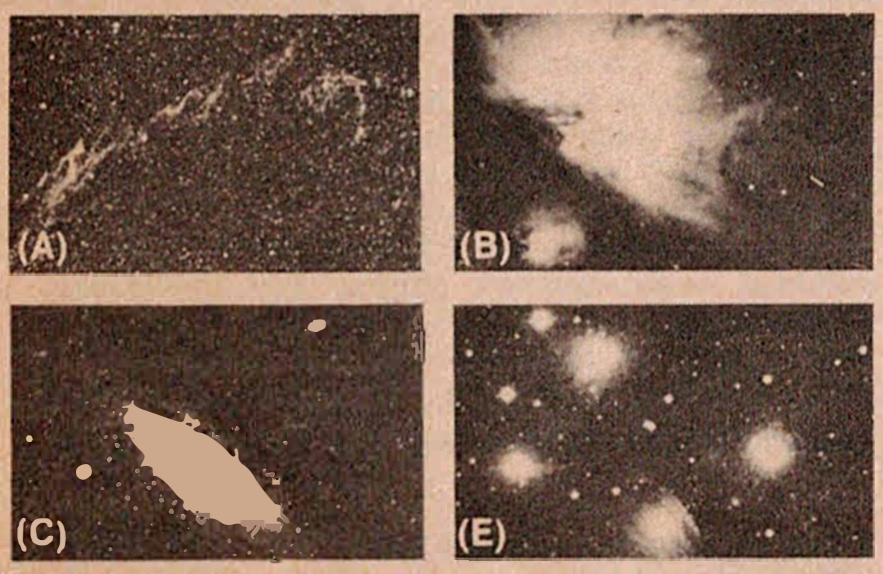
With Our Chart Of The Heavens And Beautiful Constellation Display Cards



Starwatching and identification is now made easy with this large 18 x 32" color chart and assortment of 48 color display cards. The chart has 4 star-fields, (Summer, Fall. Winter, Spring) and accurately plots all stars to +4.4 magnitude. Celestial coordinates make it easy to position objects of planets from tables, and then locate them in the sky. Useful tables on the reverse side list and describe objects for telescopes and discuss brightest stars, star names, astronomical terms, etc. The beautiful constellation cards are designed to relate the stars to their myths for easy understanding. Each card is divided into two panels. One shows the stars as they are in the sky—their size, magnitude and temperature, while the other panel shows the colorful mythological figure it represents. The reverse side has information about the stars involved. A terrific teaching tool or collector's item. Perfect for amateur astronomers.

No. 41,993 $5.95 Ppd.

Beautiful Full-Color Astro Posters



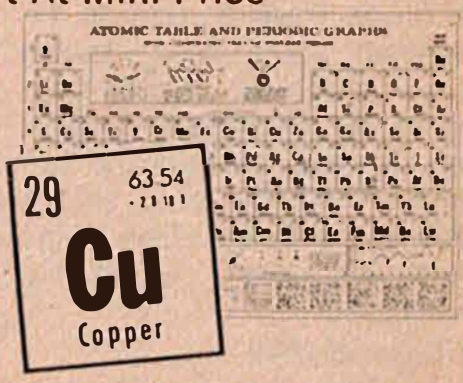
We were amazed when we first saw these fantastic 22½ x 29" wall posters. Actual photographs taken with the great telescopes on Palomar Mountain. They are of the most popular nebula, galaxy, and star subjects with fine printing on high quality gloss paper. Great for schools, home, clubs, offices, etc. So beautiful, you'll frame them. **Minimum order 3 or more @ $2.75 each.** (A) Veil Nebula—**No. 82,055** (B) Orion Nebula—**No. 82,056** (C) Andromeda Galaxy—**No. 82,057** (D) Trifid Nebula—**No. 82,058** (E) Pleiades Star Cluster—(F) Gas Neb. in Serpens—**No. 82,060**

Highly Informative Ecology Charts

These new and exciting Ecology Charts are the most detailed available. Approved by the Environmental Protection Agency and Institute of Environmental Science, these 28 x 22" full color charts are precise, up-to-date, scientifically correct, and loaded with valuable information. The creativity, style, and accuracy devoted to each piece results in 4 beautiful charts that stimulate motivation and produce quicker, more retentive learning. Set includes Air, Water, Noise, and Solid Waste Pollution.

No. 9120 $9.95 Ppd.

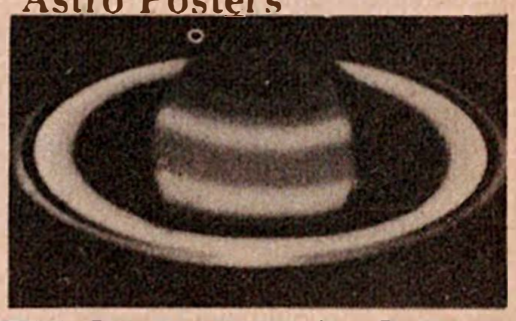
Giant Atomic Wall Chart At Mini Price



An impressive addition to any lab or classroom, this varnished, soil-resistant, 32 x 45' full-color chart is a modern reference for chemical and nuclear subjects. Explains and diagrams radioactive isotopes, solar energy, H-bomb reactions and fission. Gives symbols, names, atomic weights and electrons in each orbit of 103 elements. Graphs, diagrams, and definitions make atomic theory easier to understand.

No. 82,061 $3.99 Ppd.

Black & White Astro Posters



(A) Set of Four 20 x 28½" Black and White Posters. Taken through the telescope at Lick Observatory. Orion, Crab, Trifed, Nebula and Andromeda Galaxy.

No. P-71,875 $4.00 Ppd.

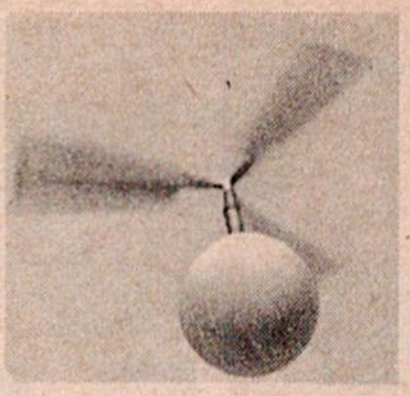
(B) Jumbo Collotype Process Prints. 2' x 3'. No screen to spoil photo effect. **$7.50 Ppd. Ea.**

Moon, Last Quarter **No. 70,243** Saturn **70,247**
Spiral Nebula-Triangulum **No. 70,245**
Horsehead Nebula **No. 71,431**
Spiral Nebula-Canes Venatici **No. 70,251**

POPULAR LOW PRICED ITEMS

Balloon Copter . . .

Powered By 3 Jet Streams
Just blow up balloon, push it into wing unit, release . . . and Balloon Copter will soar way up high! Anyone who can blow up a balloon will have loads of fun. 11" wingspread. Adjustable pitch. Copter comes with 2 balloons and instructions.



No. 60,872 $1.00 Ppd.

See 25 Repeats At One Glance

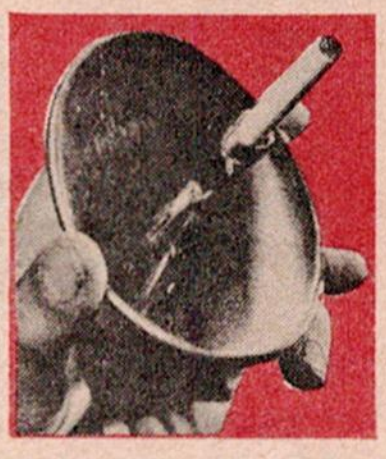
8¾ x 10" transparent plastic sheet of 25 separate 1-3/16 x 1-9/16" negative Fresnel lenses, all 67mm F.L. Look thru and see 25 repeats of one scene. Ideal for artists, photographers, and hobbyists.

No. 60,811 $1.25 Ppd.

Solar Cigarette Lighter

Amaze your friends! Point it at sun for quick "light" with no puffing. Needs no fuel, matches or flame. Use outdoors or through sunny windows. Excellent for sportsmen. Bright-plated lighter: 3 x 4" oval shape, fits in pocket, tackle box, etc.

No. 40,307 $1.49 Ppd.



Demonstrate Static Electricity

Pocket-size Static Electricity Demonstrator. Fun for your collection shelf and a fascinating teaching toy for children . . . safe, won't shock.

No. 40,714 $1.00 Ppd.

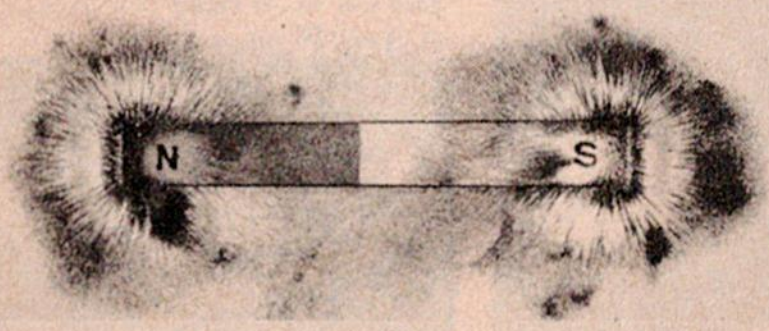
Telescoping Pointer-Pen

Extends from 5" pen to 24" pointer! Executives, teachers, students, salesmen: point out highlights in movies, charts, blackboard lessons—instantly slide this unique telescoping pointer down to a fine-writing ballpoint pen. Chromed-brass (1" ruler markings), pocket clip and point cap; in pouch with refill. **No. 40,856 $3.25 Ppd.**

3 Extra Refills **No. P-30,573 $1.00 Ppd.**

Telescopic Magnet-Pointer . . . extends to 17¾". Use as a pointer or to retrieve small metal objects (even underwater). Closed: 5¼". **No. 41,683 $2.50 Ppd.**

Magnetic Fun & Learning



Hours of fun for children. They can learn & demonstrate attraction & repulsion or just do magnetic tricks. An Alnico-V Bar Magnet with poles marked & painted . . . a blend of iron, nickel, cobalt & aluminum alloy. 6 x ¾ x ¼" thk. North Pole end painted red & marked "N"; South Pole end painted white & marked "S". Fulfills specs of CCSSO Purchase Guide for a magnet #2340.

No. 40,421 $3.35 Ppd.

Iron Filings. Use to demonstrate a magnetic field with magnet above. 1-lb. pkg. **No. 60,176 $1.80 Ppd.**

Project The Spectrum!

Disperse white light as Newton did. Turn sunshine into the spectral colors you study in art and science classes with this 90° ground and polished, optical glass prism (1-11/64" base). Slightly under gov't specifications, but a real study value. Blister-packed on card with instructions. **No. 8100 $1.25 Ppd.**

Magnetic Balls Jump, Wiggle, Defy Gravity

Play loony marbles! 4 hard rubberlike, magnetized balls roll in crazy directions. **No. 60,508 $1.25 Ppd.**

Rectangular 3-Minute Timer

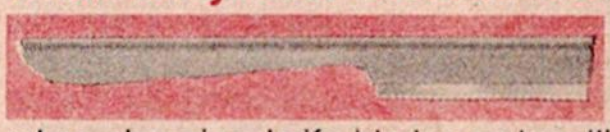
Time phone calls, eggs, players' turns, etc. Embedded in clear, plastic block, 1 x 1 x 3-3/16". Won't break if dropped. Useful gift or party prize. 4 oz. Imported.

No. 40,980 $1.25 Ppd.

Disappearing Paper

Write on it, immerse in water . . . in seconds the message floats off and the paper disappears. Looks like regular paper, but write secret messages (numbers, letters, codes) on it, and then easily, safely, completely destroy them. Non-toxic, cellulose polymer. **75 to 100 pieces,** depending on size, from approx. 2" sq. to 2¼ x 4". **No. P-41,581 $1.00 Ppd.**
(20) 8½ x 11" sheets. No. P-71,510 $3.00 Ppd.
(100) 8½ x 11" sheets. No. P-71,511 $11.50 Ppd.
***Picture disappeared after catalog was printed!**

Throw-Away Razor Blade Knives



Inexpensive; discard when dull! Ends cuts when changing knife blades or handling razors. Sharp 2" single edge blade in handle ideal for industrial and hobby use. 5" long.
Pkg. 50 **No. P-70,369 $4.75 Ppd.**
Pkg. 100 **No. P-70,372 8.50 Ppd.**

Raise Your Own Pet Sea-Monkeys®

Own the most unusual pet on your block, the amazing marine animal that exists in a state of suspended animation until immersed in water! Then they come to life instantly and after 8-12 weeks they really grow (to ½" easily; females often to ¾"). Fascinating to watch and easy to care for. Sea-Monkeys live for a year or more! Set includes: water purifier; approx. 250 Sea-Monkey eggs (almost microscopic) in super-grow formula; living plasma; 1-yr. supply of food: and illus. manual on care, "training," & breeding. **No. 41,789 $1.50 Ppd.**

Deluxe kit w/plastic aquarium. No. 71,815 $5.95 Ppd.

UNUSUAL GROWING KIT

- **Sea Monkeys® • Atomic Plants**
- **Rocks That Grow**

Fascinating educational fun! You get: (1) Sea Monkey Kit (No. 41,789 above); (2) Magic Rock Growing Kit . . . brilliant colored rocks start growing instantly when put into solution, are 1-3" tall in 30 min., make beautiful displays in any container; (3) Mighty Marigold kit of 5 packs of seeds irradiated with different amounts of Cobalt-60 (completely safe) grow astonishing mutations; (4) 5X magnifier; (5) 2" thermometer (0-120° F.); instr.

No. 41,859 $3.95 Ppd.

INCENTIVE REWARDS, GIFTS AND PREMIUMS

Premium Bonanza!

We are proud to announce our new selection of incentive rewards, gifts, premiums and stocking stuffers. We waded through samples of everything from yo-yo's to personalized tooth picks before putting together this fantastic assortment. They are all designed for your particular needs and are available in large quantities to keep the price down. If there are any super ideas we may have overlooked, please feel free to let us know. In this way we may better serve our customers.

Flintstone Buttons

Beautiful full color pin of all the favorite Flintstone T.V. characters. 7/8" button with pin back approved by U.S. Toy Safety Act. Kids love 'em! You get Barney, Fred, Pebbles, Bam-Bam, etc.

Pkg. of 50 No. P-42,029 $2.50 Ppd.

Flag Patches

New patch-up craze! These P.L.P.'s (private language patches) are actually the flag symbols used in the International Flag Code of ships. Kids will love to iron or sew these on!

Set of 42 No. 61,014 $1.00 Ppd.

Hot-Iron Transfers

These great transfers are a new printing technique. Fabulous reproductions of Laurel and Hardy, Charlie Chaplin, W. C. Fields, etc. Each packed in its own plastic capsule.

50 capsules No. 42,030 $3.00 Ppd.

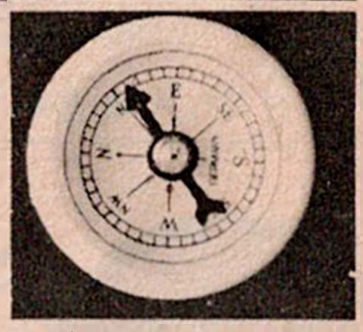
Hand Puppets

Colorful characters printed on white polyethylene. Kids can even use them for puppet shows. (30) 10 each Spacemen, Fullback, Monster.

No. P-61,012 $4.50 Ppd.

30 Santa Claus—A great Christmas gift **No. P-61,013 $4.50 Ppd.**

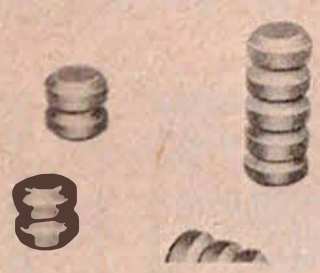
Student Compasses



A neat little 5/8" dia. compass that's great for nature study, field trips, direction studies, geography, etc. Sturdy plastic and a great gift or incentive item.

Pack of 30 No. 42,028 $5.00 Ppd.

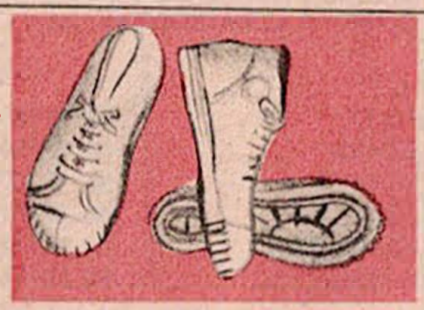
100 Magnets



Ceramic magnets (¼ x ½") that every kid in the class will enjoy. Demonstrate magnetic attraction and repulsion, or just let 'em have fun. Hang papers, tools, even make up games.

Pkg. of 100 No. P-41,762 $3.00 Ppd.

Sneaker Erasers



The latest thing for kids. Soft, safe, non-toxic plastic sneakers in bright new colors. Use as a pencil eraser, toy, party favor, novelty. Kids will be glad to correct their mistakes.

Pkg. of 30 No. P-42,031 $1.50 Ppd.

Winking Eyes

Bigger-than-life (1-3/8 x 1") colorful rendering of an eye that "winks". Kids stick 'em on their foreheads, stomach, desk, chair, everywhere! Plastic eye with self-stick backing.

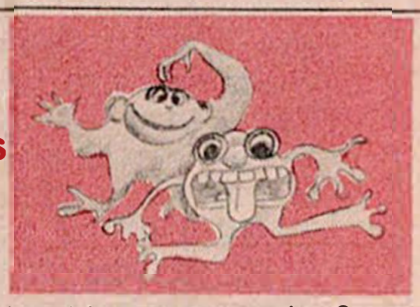
Sheet of 35 No. 42,082 $3.50 Ppd.

Eerie Creepers

A selection of spooky critters that look & feel like the real thing. Plastic turtles, snakes, bugs, lizards, every squirming animal you can imagine. They'll work harder to get these!

Pkg. of 30 No. P-42,033 $2.75 Ppd.

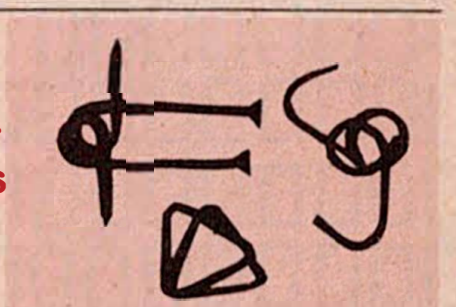
Mushy Lovables



Devilishly lovable creatures in 6 assorted characters. Safe, non-toxic, and can even be used as erasers. Great for gifts, party favors, or a kid that needs a smile.

Pkg. of 30 No. P-42,035 $5.50 Ppd.

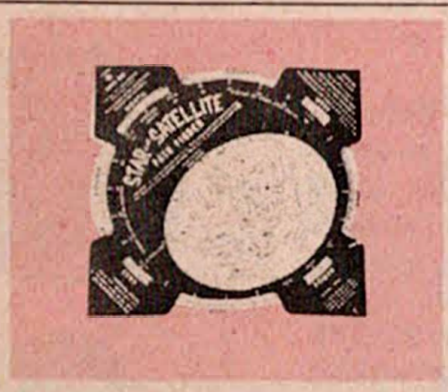
Twister Puzzles



A set of 12 brain teasing metal puzzles that will give kids hours of fun. Great for coordination and building patience. Includes circles, triangles, bent "nails", bars, etc.

Pkg. of 36 No. P-61,015 $3.00 Ppd.

Star Finder



An educational gift for those science minded students. Our famous star and planet finder shows over 500 stars and their locations. Each comes with a 16 pg. bklt.

Pkg. of 25 No. P-70,156 $10.00 Ppd.

Charm Grab-Bag

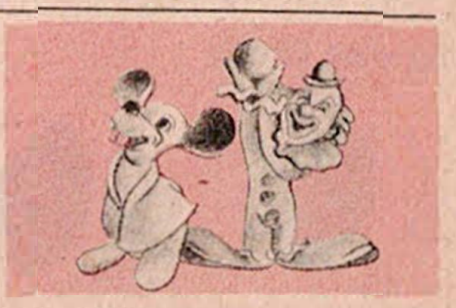
Here's the perfect assortment to use for rewards. Cheap enough to give out daily. Approx. 500 charms.

500 Bag No. P-61,016 $3.00 Ppd.

Let kids collect them on plastic key chain. Package of 50 chains.

No. P-61,017 $1.00 Ppd.

Itty Bittys



This family of charm animals will bring giggles from every kid in the class. 30 different animals to learn, squeeze, collect, use as erasers, etc.

Stand-ups Pkg. 30
No. P-42,034 $4.40 Ppd.

Finger Puppets Pkg. 30
No. P-42,032 $4.50 Ppd.

Jumping Discs . . . Scientific Curios

Full Of Surprises & Fun!

- **Fascinating! Everyone Who Sees One . . . Wants One!**
- **Jump 1,000 Times Their Own Height**

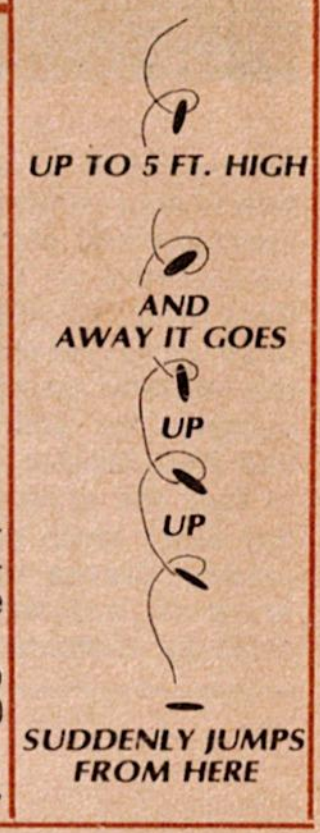
EDMUND SCIENTIFIC CO. Barrington, N. J. 08007

Amazing, paper-thin silver bi-metal discs that jump up to 5 ft. high. Work by scientific principles of thermodynamics. Heat makes metals expand, cold makes them contract. The same basic principle that causes a thermostat to turn heat on and off.

Click a jumping disc between your fingers . . . lay it down on a smooth surface . . . Pop! it suddenly jumps up to 5 ft. high. You never know exactly when they'll jump. A lot of fun and surprises. See it in action and you'll want one for yourself. They'll amaze your friends. You'll love them, play with 'em for ages, make up games with them. There's no better favor to hand out!

Each disc is 1" in diameter and 0.010" thick. Our company name is printed on the label in two colors. A package of 12 includes instructions, an explanation of how they jump, and rules for 20 games.

Pkg. of 12 **No. P-41,150 $2.00 Ppd.** Pkg. of 100 **No. P-41,180 $12.00 Ppd.**



ATTENTION INDUSTRIAL AND BUSINESS FIRMS!

Now Available in 1, 2, and 3 Colors.

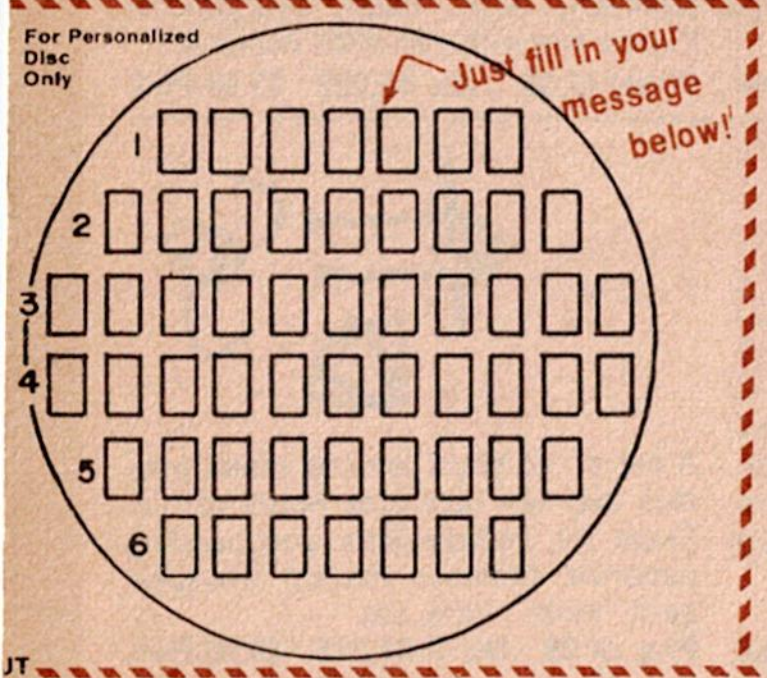
ACTUAL SIZE

Jumping Discs imprinted with your name or insignia make wonderful giveaways. They're fascinating, inexpensive, durable, and can't fail to be handled over and over again by your customers and their friends. Now available in 1, 2 and 3-color printing.

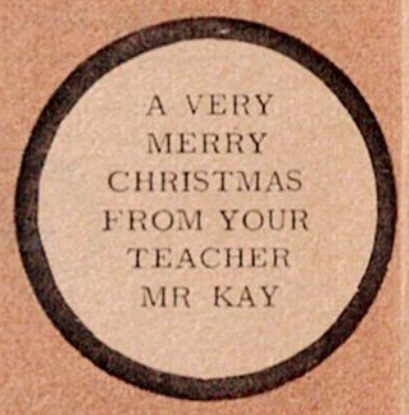
Finished Camera-ready artwork should be submitted with your order. The design should fit the circular format & be at least 1" & not more than 6" in dia. If 2 or 3-color ink is ordered the mechanicals should be prepared for color separation. Specify color & submit samples if possible. While we cannot guarantee identical colors, we'll match as closely as possible. (If you'd like our Art Dept. to prepare your artwork, send a rough layout, and we'll send you a quote.)

Quantity*	1-color	2-color	3-color
1,000-4,999	**No. 19,161** $85.00/M	**No. 19,162** $87.50/M	**No. 19,163** $90.00/M
5,000-24,999	**No. 19,164** $80.00/M	**No. 19,165** $82.50/M	**No. 19,166** $85.00/M
25,000-99,999	**No. 19,167** $70.00/M	**No. 19,168** $72.50/M	**No. 19,169** $75.00/M
100,000-499,999	**No. 19,170** $65.00/M	**No. 19,171** $66.00/M	**No. 19,172** $67.00/M
500,000-999,999	**No. 19,173** $60.00/M	**No. 19,174** $61.00/M	**No. 19,175** $62.00/M
1,000,000-and over	**No. 19,176** $50.00/M	**No. 19,177** $51.00/M	**No. 19,178** $52.00/M

*Quantities must be ordered in multiples of 1,000. All prices are quoted F.O.B. Barrington, N. J. Please allow 2-3 weeks on first order. A $29.00 one-time photo-plate charge must be added to above cost. Sorry, no C.O.D.'s. Instr. Incl.



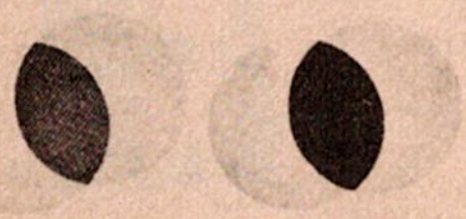
Now You Can Customize Your Own Jumping Discs!!



Send Personalized Jumping Discs as unique Christmas cards, sell them at church carnivals and fairs, use them as unusual calling cards, and promotions for special sales or events. Each disc is 1" in dia. and 0.010" thick. All lettering is printed exactly as pictured at right and is available in black ink only. To order, fill in blocks at left, cut coupon and send with check or money order. You have 6 lines for your message, with the following number of characters on each; 1) 7 characters; 2) 9 char.; 3) & 4) 11 char. each; 5) 9 char.; 6) 7 char. (Note: remember spaces count as characters too. Sorry no punctuation available.)

100 or 200 discs	**No. 29,100**	**$18.00 Per 100**
300 or 400 discs	**No. 29,101**	**$15.00 per 100**
500 discs & Up (in multiples of 100)	**No. 29,102**	**$12.00 per 100**

Polarizing Discs!



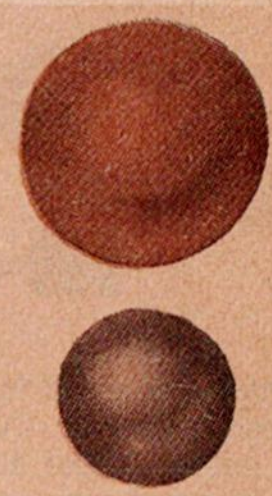
A package of 60 polarizing discs that will fascinate children. Criss-cross cellophane tape between 2 discs and watch the moving colors; shows how sunglasses keep out light.

Pkg. of 60 **No. 42,036 $6.00 Ppd.**

Balloons Galore!

Due to a major surplus buy of quality balloons, we can now offer you large quantities at amazing savings. These balloons are of far better quality than those found in the local discount stores. High grade (slightly out of manufacturer's specifications) and perfect for gifts, incentives, party favors, dance decorations, presentations . . . even classrroom experiments. Everyone can find use for a gross of balloons at these prices!

One gross 6" round **No. P-42,037 $3.00 Ppd.**
One gross 8" round **No. P-42,038 $4.00 Ppd.**



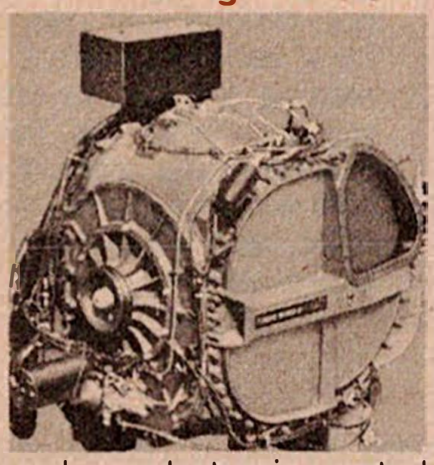
Engines of the Future, Present, and Past

Realistic Scale Models For Display And Hobby • Unique • Educational • Relaxing

Here are some of the most interesting model kits available. Many are newly introduced with movable parts and visible mechanisms. All are authentic with easy instructions.

Revolutionary New Ford Turbine Engine . . .

1/8 Scale Model Kit



This revolutionary gas turbine engine is Ford's answer to the demand for a clean burning economical power plant. They have efficiently harnessed the power previously used in jet aircraft by incorporating some ingenious engineering features, such as an exhaust regenerator, variable power turbine nozzle, and an electronic control system. Its low fuel consumption rivals many diesels, and it is now in use in trucks, busses, and boats. This motorized exact detail model demonstrates the major features of the engine . . . combustion chamber glows, compressor, turbine, regenerator, gears and power output shaft all operate! Section removes for visibility of working parts. Pre-colored parts, no painting. Instr. Uses 2 "AA" batteries (not incl.).

No. 71,851 $12.95 Ppd.

Visible V-8 Teaches Engine "Know-How"

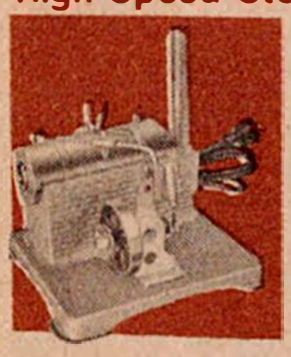
If you are an interested student of automotive mechanics or combustion engines, or just a driver who wonders "what makes it tick," here is the answer. Build this engine yourself from over 350 parts and learn about engines as you do it. This ¼ scale model does everything but burn oil. All functioning parts can be observed in motion. Molded in 4 colors; electric motor drive. Easy-to-understand instr. manual. Batteries not incl. **No. 70,448 $15.95 Ppd.**

See-Thru Honda 750 Four The Engine That Won Daytona! 1/3 Scale

A motorized working model of the 4 cylinder engine that won the Indianapolis of motorcycle racing, the Daytona Grand Prix. The Honda 750 Four is one of the most advanced motorcycles ever offered for sale. Its 68 horsepower engine revs up to an 8,000 rpm power peak, giving it a flatout top speed of more than 125 m.p.h.! Features overhead cam 4-stroke engine design; 4 synch. carbs., 4 upswept mufflers, and hemi heads with offset valves. The Honda 750 wails through the ¼-mile in 12.6 sec. This big model is packed with detail, and works like the real engine! Shows valve opening and closing, piston cycle, flashing plugs, etc. 187 metal and plastic parts and display stand. Pre-colored, no painting. Instr. incl. Uses 2 "AA" batteries (not incl.).

No. 71,750 $13.50 Ppd.

High Speed Steam Plant—Electrically Heated



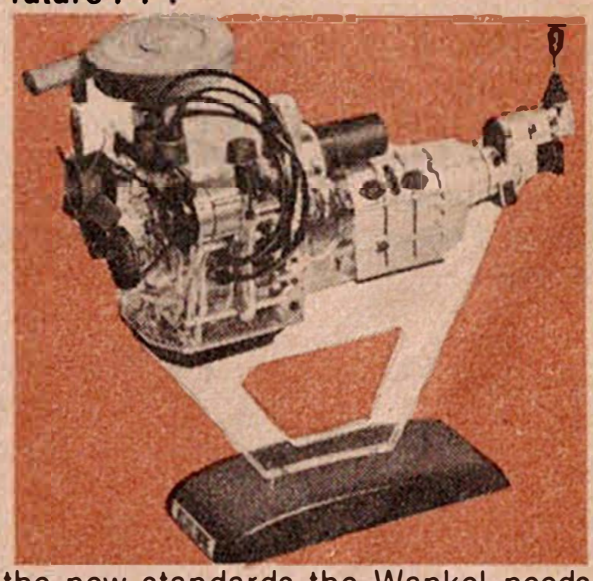
Powerful oscillating engine, ½" bore x 9/16" stroke; 3" dia. flywheel has high & low speed pulleys. Drives erector sets, models, etc. Completely safe. 6 x 2½" dia. nickel-plated boiler has safety valve, water gage, throttle valve, and whistle. Metal base: 8¾ x 9¼ x 9" h. Incl. instr. and funnel.

No. 70,822 $27.50 Ppd.

See-Thru Wankel Rotary Engine

The engine of the future . . .

1/5 scale model kit



Why all the fuss about Wankel? In a word, pollution. The Wankel, most experts say, is the only engine which can be modified to meet the proposed emission-control standards, and still be economically feasible. To meet the new standards the Wankel needs only an exhaust recirculation system . . . the cost on other engines would be astronomical. The significant principle of the Wankel is replacing the piston, cylinder, and crank assemblies with simple rotating discs which have sections removed to form firing chambers. Smaller than conventional engines, it has fewer parts, resulting in less wear and friction, greater reliability, and lower horsepower requirements to achieve the same speeds. Kit features flashing plugs, rubber fan belt, stick-shift on-off switch, and prepainted parts of metal and see-thru high strength plastic. Motor display stand, and instr. incl. On 3½" stand, assembled motor is approx. 8" high x 5" wide x 9½" long. Requires two "AA" batteries (not incl.). Build it, watch it work.

No. 71,424 $6.95 Ppd.

"The Wankel Engine" J. Norbye. Most informative book available! Features design, theory, development, and application. Detailed illus., 6¼ x 9½" 518pp, hard-back.

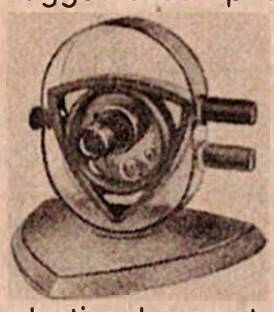
No. 9439 $15.25 Ppd.

Actual Wankel Engine Demonstration Set

- **Also A Functional Model Airplane Engine**
- **Fantastic quality**
- **Precision made in Germany**

A terrific handful of horsepower! Now teachers can demonstrate an actual Wankel engine rather than just a model or mock-up. The Rotary Engine makes a perfect model airplane motor too . . . and since it has almost 40% fewer parts, it is simpler, smaller & lighter than most motors.

The outstanding features include the engine's power, smoothness & almost total lack of vibrations (making it extremely quiet). It's a beautiful piece of precision workmanship . . . with old-time craftsmanship, that's rugged & compact for practical use.



Overall size is approx. 3½ x 2¾" dia. & weighs less than 1 lb.! Air-cooled, single-rotor engine with .30 cu. in. displacement. It has a glow-plug ignition system & a throttle type carburetor. Runs on standard methanol-based model fuels. ½ hp; 16,000 rpm.

The set also includes a see-thru plastic demonstrator of the Rotary Engine. With this easy-to-assemble kit, you learn the Rotary principle and actually "see" that it operates without the pistons, etc., associated with a conventional reciprocating engine. Propellor also incl. **No. 71,860 $99.50 Ppd.**

MAGNIFIERS

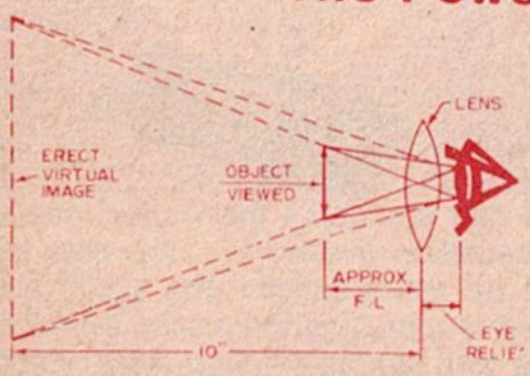
Magnifiers And Their Characteristics

Magnifiers have hundreds of applications. Industry uses them for production line inspection, reading small scales, examining surfaces, etc. They are important to hobbyists (incl. stamp and coin collectors). In schools, magnifiers extend the range of vision and help explain many science and nature phenomena. Many types have evolved for special uses—the watchmaker's loupe, fingerprint magnifier, linen tester, PRE-COPTIC (for graphic arts), etc. All are governed by the laws of optics. It is impossible to have a large diameter magnifier of high power, wide field of view and long working distance. Edmund's selection of magnifiers is one of the largest.

"All About Magnifiers" By Sam Brown

New, enlarged edition of our popular magnifier book which we now call "All About Magnifiers". Discusses magnifiers in detail with: magnifier optics; making your own magnifiers; mirror magnifiers; tele-magnifiers; measuring magnifiers; reading glasses; as well as numerous projects you can build (4X flash magnifier, magnifying tweezer, water glass, clearview bases, black-light rock box, low-power microscope, binocular magnifier, and ideas for your aquarium). 18 pages plus covers. 8½ x 11". **No. 9002 50¢ Ppd.**

The Power Of A Magnifier (Divide F.L. into 10")



The sketch shows your eye looking at a close object. 10" is assumed to be as close as you can focus for comfortable vision. Now, if you assume 10" to be normal vision, an object 1" from your eye would be 10 times closer and seem 10 times larger, if you could see it! The function of the magnifier is to make this close view possible. Since a 1" focal length lens brings clear vision down to 1" from the eye, an object at this distance is clearly seen and appears to be 10 times larger than when viewed 10" away. Such a magnifier is commonly called 10X or 10 power. To find the power of any magnifier simply divide the focal length (F.L.) into 10", or if working with millimeters, into 254mms.

The Perfect Magnifier . . . An Impractical Dream

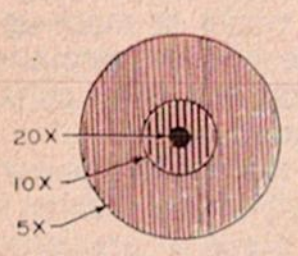
A perfect magnifier would be lightweight, have a large diameter to provide a wide viewing area, and offer high magnification. Unfortunately, incorporating all these features into one unit is impractical (although not impossible). Here's why:

The magnifying power of a lens is dependent upon its Focal Length (F.L.) . . . the shorter the F.L., the higher the magnifying power. The F.L. is dependent upon the curvature of the lens . . . the greater the curvature, the shorter the F.L. (and the more powerful the lens).

To maintain a lightweight, simple and inexpensive magnifier, the lens diameter must decrease as the curvature increases (providing greater magnifying power). Conversely, as the lens curvature decreases, the diameter can be increased (with a resulting reduction in power but an increase in viewing area).

Therefore, you can either have a magnifier with a large diameter (offering more viewing area and less magnifying power) . . . OR . . . you can have a magnifier with a small diameter (offering less viewing area) and greater magnifying power. But both cannot be incorporated without elaborate, weighty, high-cost lens systems.

Field Of View



This is the area seen through the magnifier. As the power of a magnifier increases, its lens diameter and field of view decrease. At five power you have about a 1½" field of view . . . at ten power, about ½". In many cases, it is best to use a low power magnifier for scanning surfaces, and another one of higher power for checking questionable areas.

Working Distance. This is the distance between the object under examination and the magnifier when the latter is in focus. A magnifier must usually be held a little closer to the object than its focal length. The working distance, therefore, is about the same as the F.L. of the magnifier. For example—

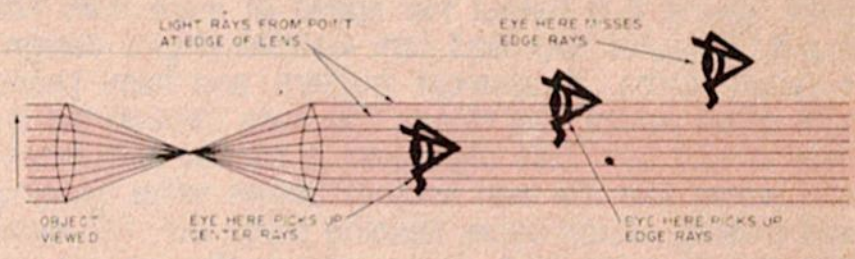
Magnification	F.L.	Approx. Working Distance
1X	10"	10"
5X	2"	2"
10X	1"	1"
20X	½"	½"

Depth Of Field. This is the distance between closest and farthest points at which a magnifier in a fixed position stays in focus. A valuable feature when uneven surfaces are being examined. The depth of field decreases as power increases; e.g., at 10X the depth of field is about half that of 5X.

Optically Corrected Magnifiers Have More Than One Lens Element

Above are some of the basic optical systems used in magnifiers. The single lens is satisfactory for low powers. Higher powered magnifiers require two or more lens elements for good resolution and correction of chromatic or other aberrations.

Comfortable Viewing. Hold magnifier close to eye (reduces reflections) and bring object into focus. As shown in the diagram, a close eye position receives rays through the center; a more distant position receives ray from edge of lens. If eye is moved farther back from lens, the rays miss the eye and you won't see the wide field that's possible with a close eye position.



The greater the distance between lens and eye, however, the greater the magnification. Thus, reading glass magnifiers used a distance from the eye give a greater magnification than results from dividing their focal lengths into 10".

Fresnel Burning Lens With 7X Magnifier

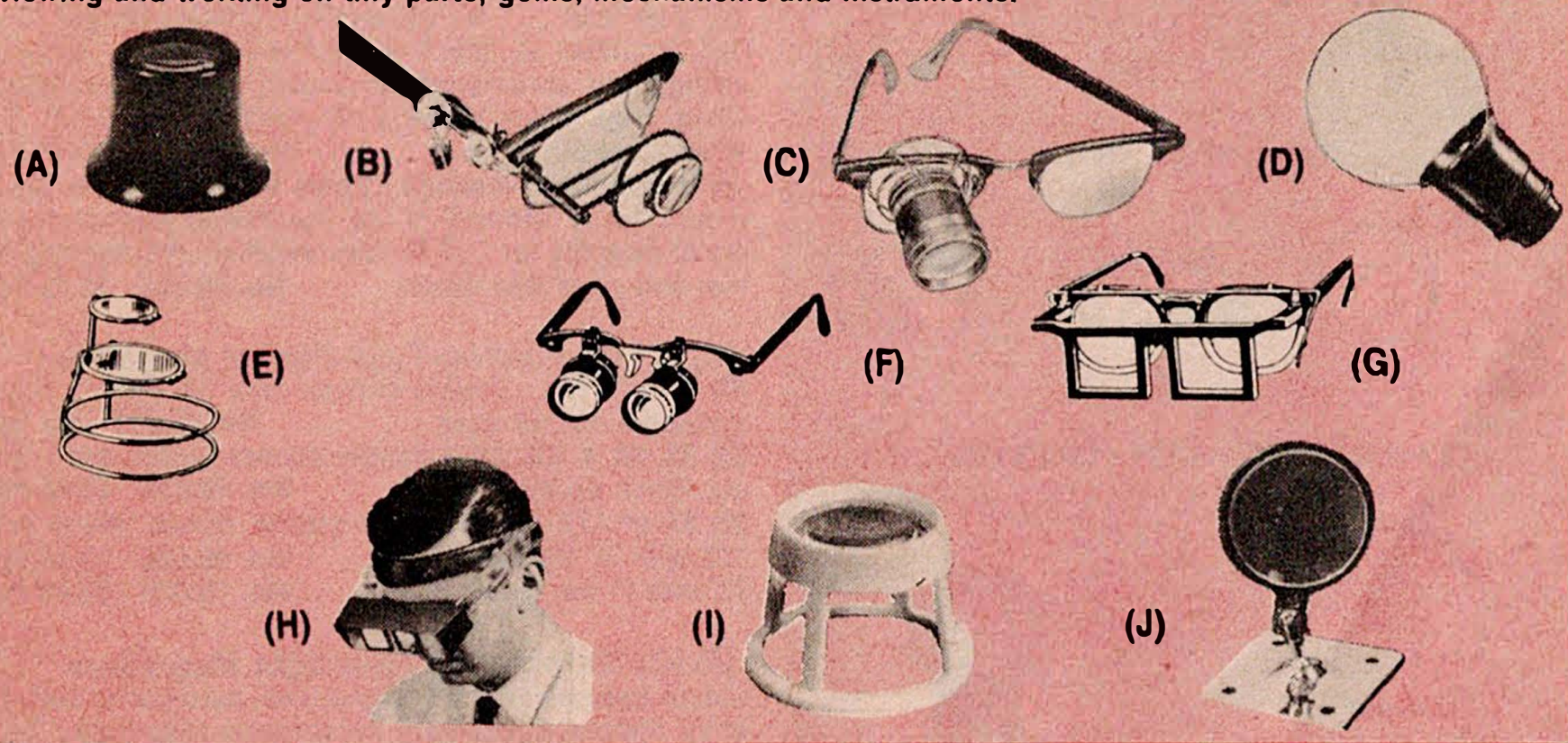
Burns paper, lights cigarettes from sun's rays. 3X magnifier with a 11/16" dia., 7X area for reading maps, etc. Both in sturdy transparent plastic sheet, 2-3/16 x 3½". Case.

No. 30,616 $1.35 Ppd.

A GOOD MAGNIFIER IS A HANDY TOOL TO HAVE AROUND.

Watchmaker's Eye Loupes & Binocular Magnifiers

Excellent for jewelers, hobbyists, craftsmen; for work in production, inspection, etc. Handiest magnifiers for viewing and working on tiny parts, gems, mechanisms and instruments.



(A) Watchmaker's Eye Loupes

1" dia. lenses. Easy-to-clean black plastic mounts. Include lightweight, comfortable spring-steel headbands with permanent spring-backs as listed below.

Working Distance	Power App.	With Headband No.	With Headband Price Ppd.	Without Headband No.	Without Headband Price Ppd.
2 in.	5X	40,146	$1.40	40,142	$0.95
2½ in.	4X	40,147	1.40	40,143	.95
3 in.	3¼X	40,148	1.40	40,144	.85
4 in.	2½X	40,013	1.40	40,012	.85

(B) Clip-On Spectacle Loupes

For precision work applications. High quality lenses set in sturdy, chrome plated mounts. Arm, holding swing-away lenses, attaches securely to either wire or plastic eyeglass frames. Lenses swing up out of line of vision

Power	Lens Dia.	F.L.	No.	Price, Ppd.
Double Loupes				
3X, 5X, 8X	24, 20mm	3½", 2"	40,513	$8.25
5X, 10X, 15X	24, 15mm	2", 1"	40,514	8.25
Single Loupes				
2X	24mm	5"	40,510	$6.00
4X	24mm	2½"	40,511	6.00

(C) Eyeglass Wearers' Clip-On Monocular

High-quality, telescopic-type, 3X monocular with long, 9" working distance. Use for assembly, inspection, reading vernier scales, observing close-tolerance machining. Coated, achromatic lenses; wide field of view. Lightweight metal monocular only 1 oz.; attaches to your eyeglasses. 2" long 1-1/8" dia. barrel 1½" dia. clip-on mount. **No. 40,720 $22.95 Ppd.**

(D) Dual Power Eye Loupe

Use it complete as shown for 7½X magnification. Screw off front element for 4X. Lens dia., front ¾", back 1". Working distances 5/8" at 7½X, 1¾" at 4X.

Without headband. No. 40,150 $1.95 Ppd.
With headband. No. 40,036 2.50 Ppd.

(E) Spectacle Loupe

Hooks over eyeglasses. Use both lenses for 11X, swing away front lens for 6X. Dia. of lenses 7/8" and 9/16".

No. 30,027 $4.35 Ppd.

(F) 3X Achromatic Binocular Loupe

Fine visual aid for industrial worker and hobbyist. Chromatically corrected optics, gives 3-power binocular vision, good 10" working distance (no bending over work) interpupillary adjustments (45-62mm), swings up out of line of vision when not needed. 2¾ oz.

On lensless frame. No. 70,610 $41.00 Ppd.
With eyeglass clips No. 70,609 $41.00 Ppd.

(G) Telesight Magnifiers

Allows magnification without loss of correction, reduces eye fatigue. Free hands. Swing out of way when not needed. Wt. 1 oz. Clamps to eyeglass frames.

Focal Range	Power	Stock No.	Price, Ppd.
10"	2X	50,240	$16.95
6-2/3"	2.5X	50,241	16.95
5"	3X	50,242	16.95

(H) Flip-Up, Binocular Magnifiers

Handy and comfortable to use because they eliminate squinting and provide greater depth so important for eye-hand coordination in close, precision tasks. Lenses, recessed to prevent scratching, are mounted in clear lucite frame to give clear all around viewing. Eye-shade prevents glare. Can be worn over glasses and used with bifocals. Padded leatherette, adjustable headband for maximum comfort. Accessory 2½X swing-in loupe is available for either eye. When in use this reduces the working distance about one half.

Power	Wrk. Dist.	Stock No.	Price, Ppd.
1-1/8X	9"-9½"	70,699	$10.95
1½X	5"-5½"	70,698	10.95
2½X	3¾"-4¼"	70,697	13.75

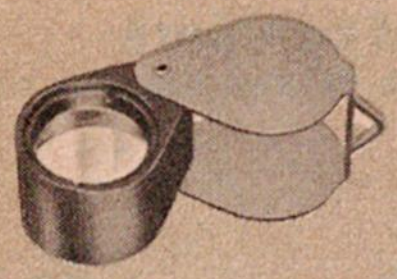
No. 40,736 Accessory 2½X swing-in loupe. $2.70 Ppd.

(I) Low-cost 3X Magnifier

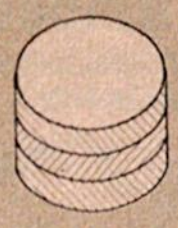
Wide field of view, 2-5/8". Precision-polished, double-convex lens. 1-7/8". Open plastic base allows plenty of light to reach work. **No. 50,254 $2.30 Ppd.**

(J) Surplus Magnifier Assembly . . . 2½X, 4" F.L.

Below original cost! Use in shop, photo lab, sewing, fishing, hobbies, where anything requires magnification. 2" dia. framed magnifier on 2 1/8" sq. stainless steel ball joint swivel base. **No. 41,586 $1.00 Ppd.**
Pkg. of 5 No. P-41,587 $4.25 Ppd.



(A)



(B)

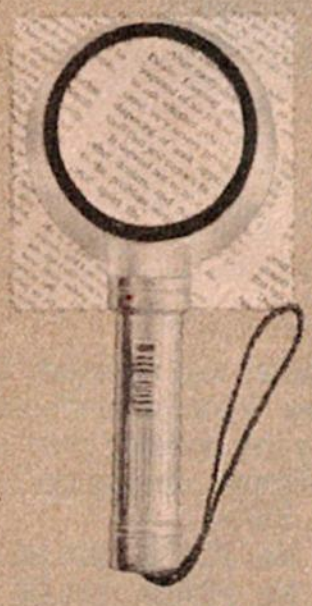
10X Hastings Triplet

(C)

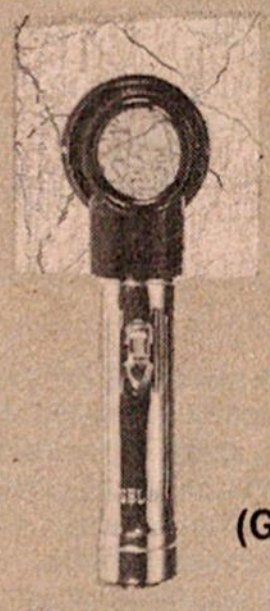
(D)

(E)

Pocket Size, 3X to 12X—Low as 50¢

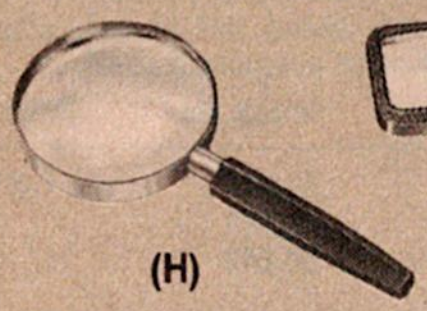


(F)

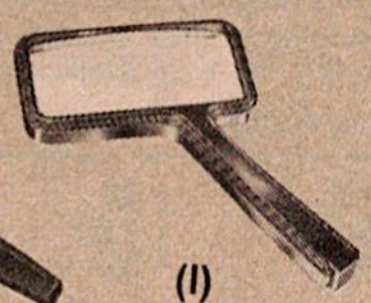


(G)

(F) (G) Flashlight—2X to 10X

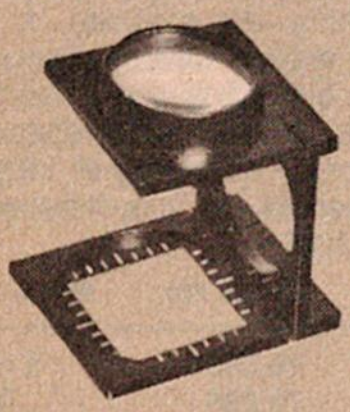


(H)



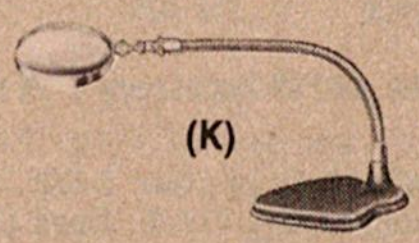
(I)

Reading Glasses—Wide view, lower power



(J)

Linen Testers—
Excellent for Printers and hobbists of all kinds as well as for textile inspection.



(K)

(L) Study Nature At Close Range!

(A) (B) 10X Hastings Triplet Pocket Magnifier

(A) The most favored pocket magnifier with highly corrected, cemented triplet lens system. Used by jewelers, gem collectors, engravers, machinists, manufacturers, etc. Flat field . . . no distortion, no color fringes. Sturdily mounted in black anodized aluminum cell. Cell swings into chrome-plated pocket case for protection. Chain loop. Clear lens dia. ½", field of view 9/16". Size when closed ¾ x 1¼". **No. 30,344 $10.50 Ppd.**

(B) Unmounted Hastings Triplet. Same as above, but no mount, 19/32" (15mm) in dia. Purchased by manufacturers in quantity for O.E.M. use, excellent for reading vernier and other fine scales. **No. 30,120 $6.75 Ppd.**

(C) (D) (E) Folding-Type Pocket Magnifiers

(C) 4X. 2" dia., double-convex lens in plastic frame; simulated leather case. **No. 40,024 65¢ Ppd.**

(D) 3X, 6X & 9X. All 3 double-convex lenses are 7/8" in dia. Black plastic case. **No. 40,032 $3.45 Ppd.**

(E) 8X or 12X Doublet. For greater power. Metal case,
12X with ½" dia. lens. **No. 40,028 $3.15 Ppd.**
8X with 1" dia. lens **No. 40,029 $5.00 Ppd.**

(F) (G) Illuminating Flashlight Magnifiers

Use to examine textiles, signatures, auto parts, taps and drills. Simple, convenient microscope substitute. Use in retouching photos. Perfect for doctors, hobbyists, philatelists. (F) Has large, 75mm dia., 2X double-convex lens in plastic base & 4¾" chromed case. Gives wide field of view. (G) 2 plano-convex lenses give flat, wide field. Enamel and chrome finish. Engraved inch & mm scales. 3-4/5" case. Batteries not incl.

(F) 2X 75mm dia. lens **No. 71,018 $5.10 Ppd.**
(G) 5X 50mm dia. lenses **No. 50,154 $6.30 Ppd.**
(G) 7X 30 mm dia. lenses **No. 50,143 $3.10 Ppd.**
(G) 10X 30mm dia. lenses **No. 60,366 $5.25 Ppd.**

(H) (I) Reading Glasses

Used to read wide columns of small or difficult type. Unusually low power (about 2X) to give a long working distance and wide field of view.

Style	Dia. of Lens.	No.	Price, Ppd.
(H)	3"	**40,027**	**$4.00**
(H)	4"	**30,031**	**$5.25**
(H)	4½"	**60,354**	**$6.50**
(I)	2 x 4"	**30,021**	**$5.50**

Not Shown, 2 x 2½" Plastic lens, No. 60,635 $1.00 Ppd.

(J) Linen Testers

Tops for counting threads in textiles; for examining printing, stamps, engraving; for industrial inspection. Stands have handy scale on base and fold flat. Opening allows placement of magnifier on object. 5X model has achromatic (color corrected) wide-field lens.

Power	Lens Dia.	Stand	No.	Price, Ppd.
5X	1-1/8"	Brass	**40,649**	**$4.88**
6X	1-1/16"	Aluminum	**40,030**	**$3.30**
9X	½"	Aluminum	**40,031**	**$3.85**

(K) Gooseneck Magnifier For Inspection

Low power (approx. 2X) for wide field and longer working distance. Ideal for rapid, repetitive inspections in office, factory, laboratory. Large 4" diameter glass lens in chrome plated brass mount is attached to 12" long flexible gooseneck. Ball swivel joint provides movement in any direction. Weighted metal base has gray wrinkle finish. **No. 70,241 $12.00 Ppd.**

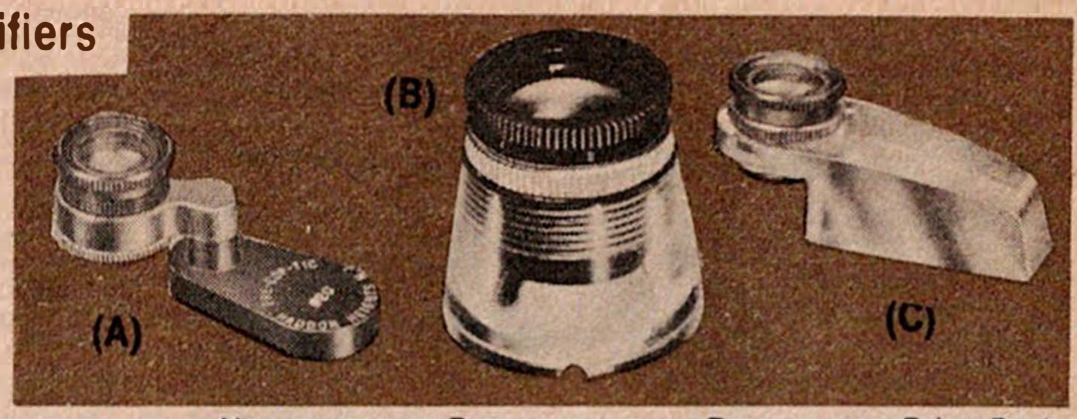
(L) Handy 2-Lens 5X Magnifier

3-D Nature Viewer enables you to catch small insects and study them at 5 times their normal size . . . while their movements are restricted to a minimum of space. Pocket-size (4-1/8 x 1-3/16" dia.) plastic viewer is perfect for field trips. **No. 41,472 $1.70 Ppd.**

NOT AVAILABLE

Highly Corrected Achromatic Magnifiers

Some of the best high powered magnifiers made. Outstanding wide-angle field of view plus excellent flat field and unexcelled definition. Highly corrected, 3-element lens systems. Tops for anyone in graphic arts.



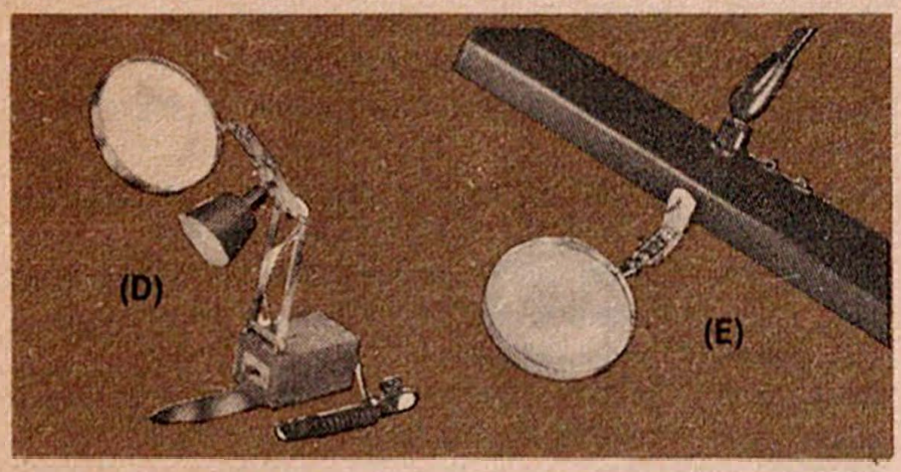
(A) Pre-Cop-Tic Swing Base Magnifier. Most popular one in graphic arts field for examining halftone dots. Focal length; 9X is 1-1/8", 12X is 13/16"; field of view: 9X is 1", 12X is 3/4". Dia. of lens is 11/16".

No. 30,009 (9X) $12.95 Ppd.
No. 30,010 (12X) $12.95 Ppd.

(B) Pre-Cop-Tic Clear or Opaque Base. Same lens systems as above. Choice of clear plactic base (admits light) or opaque base (for internally lighted specimen). The latter is extremely useful for negative stripping work or in focusing image on camera ground glass.

No.	Power	Base	Price Ppd.
30,057	9X	Clear	**$12.95**
30,055	12X	Clear	**12.95**
30,056	9X	Opaque	**12.95**
30,054	12X	Opaque	**12.95**

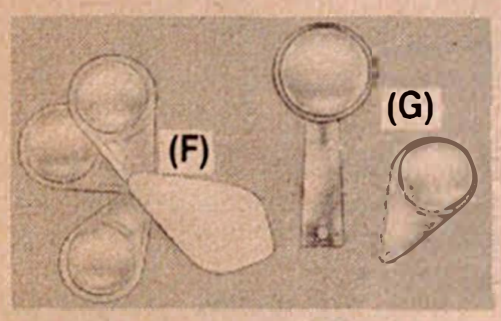
(C) Pre-Cop-Tic with Plastic Handle. Same lens systems as A & B. Clear plastic handle popular with etchers . . . resists acids, will not block light. Measures 1" high x 1-3/8" wide x 3½" long. **No. 30,223 (12X) $16.25 Ppd.**
No. 30,224 (9X) $16.25 Ppd.

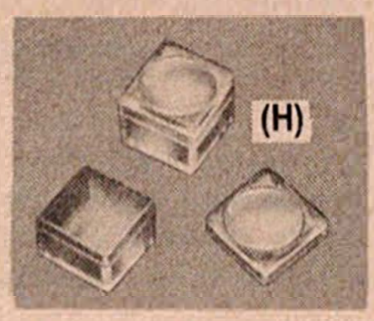


(D) Illuminated 2X Magnifier Large magnifier and glare free, 200w illumination. 7" F.L. lens (4½" dia) on 12" arm, 4 joints for almost unlimited positioning. Lens swivels 360°. Has 3-way switch and is double-jointed for direct aiming. Metal base (3¾ x 2¼ x 2¼") hung or mounted. American-made; 115v AC, incl. No. 1133 bulb. **No. 71,004 $35.95 Ppd.**

(E) Swivel Clamp Magnifier, 2X
4" dia., 8" F.L. magnifier gives wide field of view and ample working area. Screw clamp with 5/16" clearance attaches to light fixtures; double-ball joint adjusts to any position. **No. 30,249 $8.00 Ppd.**

Plastic Loupes and Magnifiers . . . Bargains





(F) Tri-Lens Loupe: 5X, 10X, 15X. Ideal for hobbyists, industrial workers, educators, etc. 3 (5X) magnifiers can be used singly or in combination, to double or triple magnification. 7/8" dia. dcx.

Pkg. of 3 No. P-41,834 $2.00 Ppd.
10 Pkg. or more @ $1.50 each Ppd.

(G) Plastic Magnifiers—Pkg. of 10. 4X & 5X magnifiers, dcx lenses, great for collectors. 100's of uses!

4X Pkg. of 10 No. P-41,837 $2.25 Ppd.
5X Pkg. of 10 No. P-41,836 $1.50 Ppd.
10 Pkg. or more of 5X @ $1.00 each Ppd.

(H) Clear Magnifier Boxes—Pkg. of 10. Non-yellowing acrylic 1" magnifier boxes, ideal for viewing insects, stamps, coins & 100's of other small objects; 7X; 38mm F.L.; dcx; 1 x 1 x ¾". **(10) No. P-41,835 $2.50 Ppd.**
10 Pkg. or more @ $2.00 each Ppd.

Magnifiers for the Poor Sighted

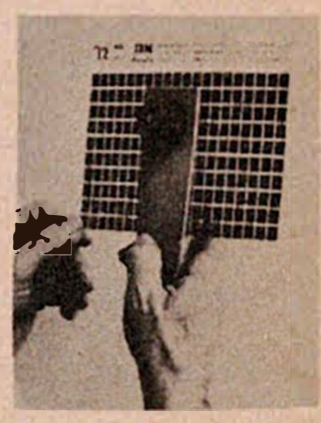
• Low Vision Aids • Aspheric Lens Magnifiers
Larger fields of undistorted magnification than comparable lenses in the same price range; for poor sighted, hobbyists, industry, etc. Specially ground & polished unbreakable acrylic lenses. Light-weight (won't tire elderly). Ideal for those with weakened eyesight.

(I) 3X Hand Magnifier: 70 x 57mm (2¾ x 2¼"). 2" field of view **No. 41,782 $17.50 Ppd.**

(J) 5X Hand Reader: 53mm dia. 1½" field of view. **No. 41,783 $11.25 Ppd.**

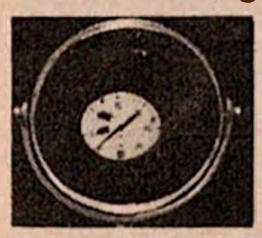
(K) 3X Stand Magnifier: 70 x 57mm (2¾ x 2¼"). 2¼" field of view. **No. 41,784 $23.50 Ppd.**

Pocket-Size Microfiche Viewer . . . 16X



Low-cost viewers for industry, schools, libraries, gov't agencies, etc. Designed for short duration reading, quick reference checking, specification, & detail verification. Permits instant retrieval of compressed data . . . saving time, space, and expense (improving efficiency of any existing microform system). A precision engineered instrument (1¼ x 2-1/8 x 5¾") that fits hand, pocket, portfolio, or drawer . . . ready for use in an instant. For microfiche (4x6, 6x8) in standard or COM format, aperture cards, micro jackets. High impact plastic body. Variable focus lens system for max. peripheral distortion. Use any natural or artificial light. Instr. incl. **No. 60,952 $20.75 Ppd.**

Big Magnifier Makes Remote Gauge Reading A Snap



Large 7½" dia. acrylic magnifier has 30" F.L. and gives 1½X that's good for reading instrument dials. Has 9/16" acrylic ring frame which can be drilled or notched for mounting. Manufacturer's surplus magnifier also good as a lightweight (10 oz.) reading magnifier and for viewing coins, stamps, jewels. Use as is or mount two (for shorter F.L.) for use in assembly of small parts.

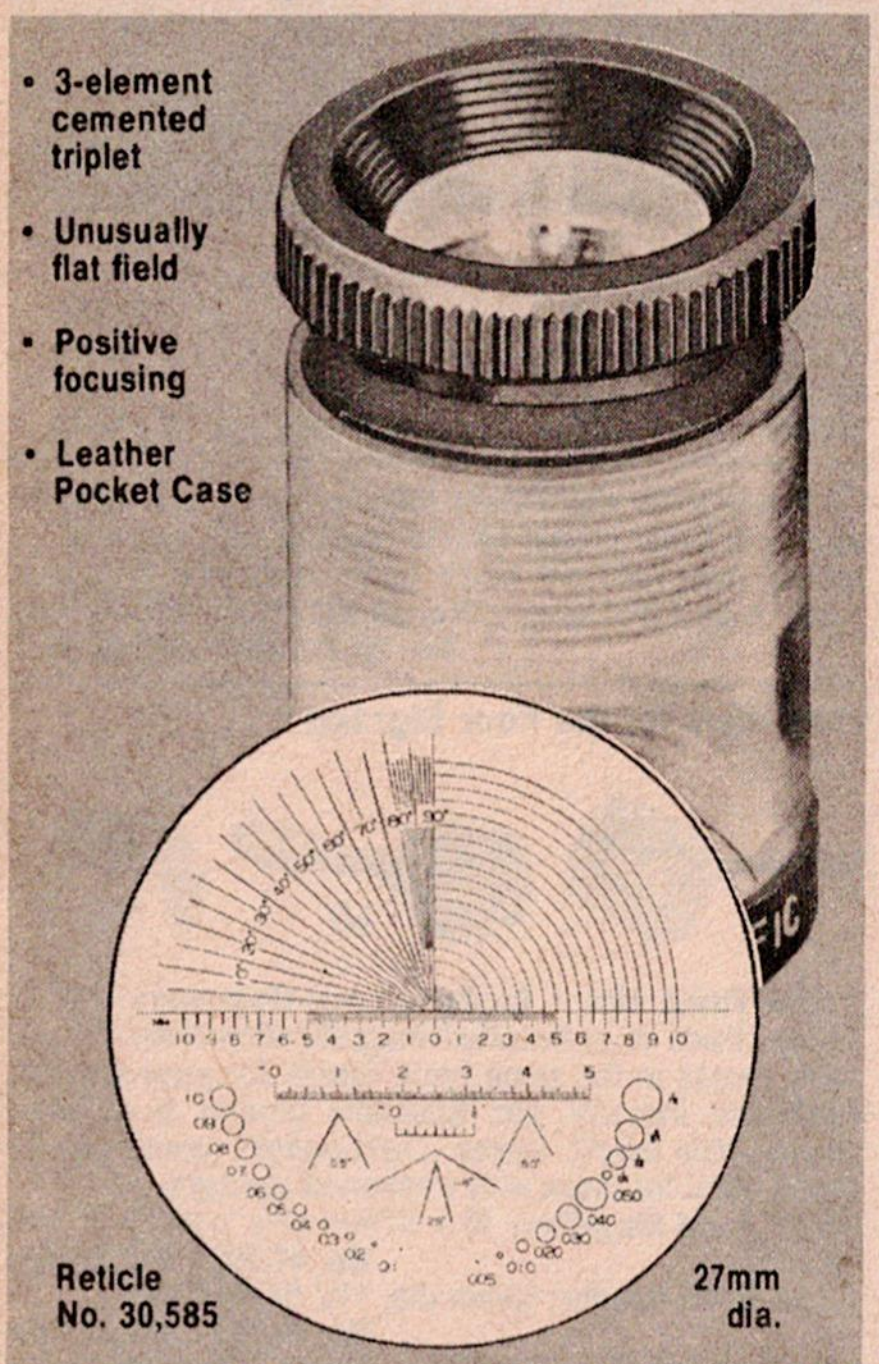
No. 41,919 $6.95 Ppd.

10 or more @ $5.95 each.

EDMUND PRECISION POCKET

6X Edscorp Pocket Comparator

- 3-element cemented triplet
- Unusually flat field
- Positive focusing
- Leather Pocket Case



Reticle No. 30,585 — **27mm dia.**

The Edscorp Pocket Comparator has hundreds of uses and applications in industry, in the laboratory and at the workbench. Instantly ready for use, it requires no time-consuming adjustments. Ideal for checking small parts, small linear measurements, angles, hole diameters, thread sizes, etc. Special reticles are listed for geological sand measuring, metrology, aerial photography, etc.

This 6X comparator, with triplet lens, (lower priced comparators usually have only simple lens), provides a flat field over entire reticle area, assuring accurate measurements. Light is admitted through the clear plastic cell-walls (in dark areas use our No. 50,076 illuminator listed at right. Pocket-size, 2" high x 1¼" dia., handy for on-the-job applications and easily portable to any location. Accepts all of the 27mm dia., etched, glass reticles. Individually described, here and in next column.

Comparator Magnifier with case (reticle not included). **No. 30,325 $16.50 Ppd.**

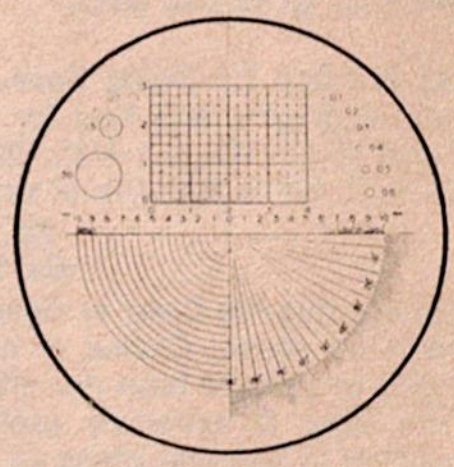
Above Comparator Magnifier, complete with Reticle (No. 30,585), leather case. **No. 41,055 $23.50 Ppd.**

Reticle No. 30,585; 20mm horiz. scale numbered 1 to 10 left and right with central ten mm in .1mm and one mm in .05mm. Half-inch horiz. scale in .005", numbered each .1". Also 1/8" in 1/64" divisions. Ten circles with diameters from 1 to 10 mm and ten with decimal and fractional inch diameters from .005" to 1/16". Angle scales 29°, 55°, 60°, 118°. (27mm dia.) **$8.95 Ppd.**

Reticles (27 mm dia.) . . . $9.25 Each

27mm dia., etched-glass reticles; pigment filled, won't warp. Valuable for industrial measurements, for use with 6X comparators, also with 12X comparator (No. 30,178) giving 13mm visible field: **$9.25** ea. Ppd.

Reticle No. 30,584; .3 x .4" grid in .025" squares. Horiz. scales .4" long graduated .005", and 20mm long graduated in 200 parts numbered each mm. 90° protractor in 1° divisions, numbered every 10°. Radius scale numbered each mm, graduated each 0.5mm. 9 circles, 0.1 to 3mm dia.



Reticle No. 30,323; 20mm scale in 200 parts. Graduated every 0.1mm; numbered every 1mm.

Reticle No. 30,587; fifteen line widths in increments from .001 - .016".

Reticle No. 30,586; 13 line widths (mm) .04, .05, .06, .07, .08, .09, 0.1, 0.15, 0.2, 0.25, 0.3, 0.35, 0.4mm.

Reticle No. 30,589; 10mm radius scale numbered each mm, radii each ½mm, 180° protractor numbered each 10°, graduated each degree.

Recticle No. 30,588; 10mm square divided into ½mm squares. 10mm scale in 100 parts. 13 circles, 0.1mm to 2½mm.

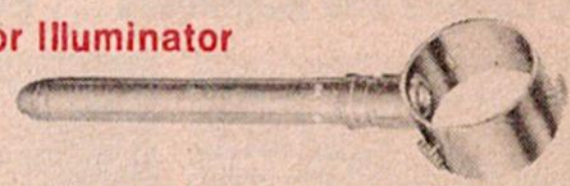
Reticle No. 30,591; 9 (inch) **screw threads** shown in TPI, 50, 32, 28, 26, 24, 18, 16, 14, 8.

Reticle No. 30,590; 9 metric **screw threads,** 0.25, 0.3, 0.35, 0.4, 0.45, 0.6, 0.75, 0.9, 1.00mm.

Reticle No. 30,174; Geological Sand 10mm grid scale, numbered every mm with 2mm grid ruled in .2mm squares, includes 1/16, 1/8, ¼, ½, 1, 21 and 4mm circles, for grain size measurements.

Reticle No. 30,461; Aerial Photography. 20mm scale graduated each 1/10mm, numbered 0 to 20. Foot scale graduated every .0005', numbered every .005' Compass rise calibrated each 5°, 0°, to 180° left to right and right to left.

Comparator Illuminator



Use inside machinery, dark areas, etc. 7½" battery-operated light illuminates both the reticle and work. Accepts pocket comparators from 7/8 - 1-7/16" O.D. Chrome finish; includes batteries.

No. 50,076 $9.00 Ppd.

Clip-On Binocular Magnifiers . . .

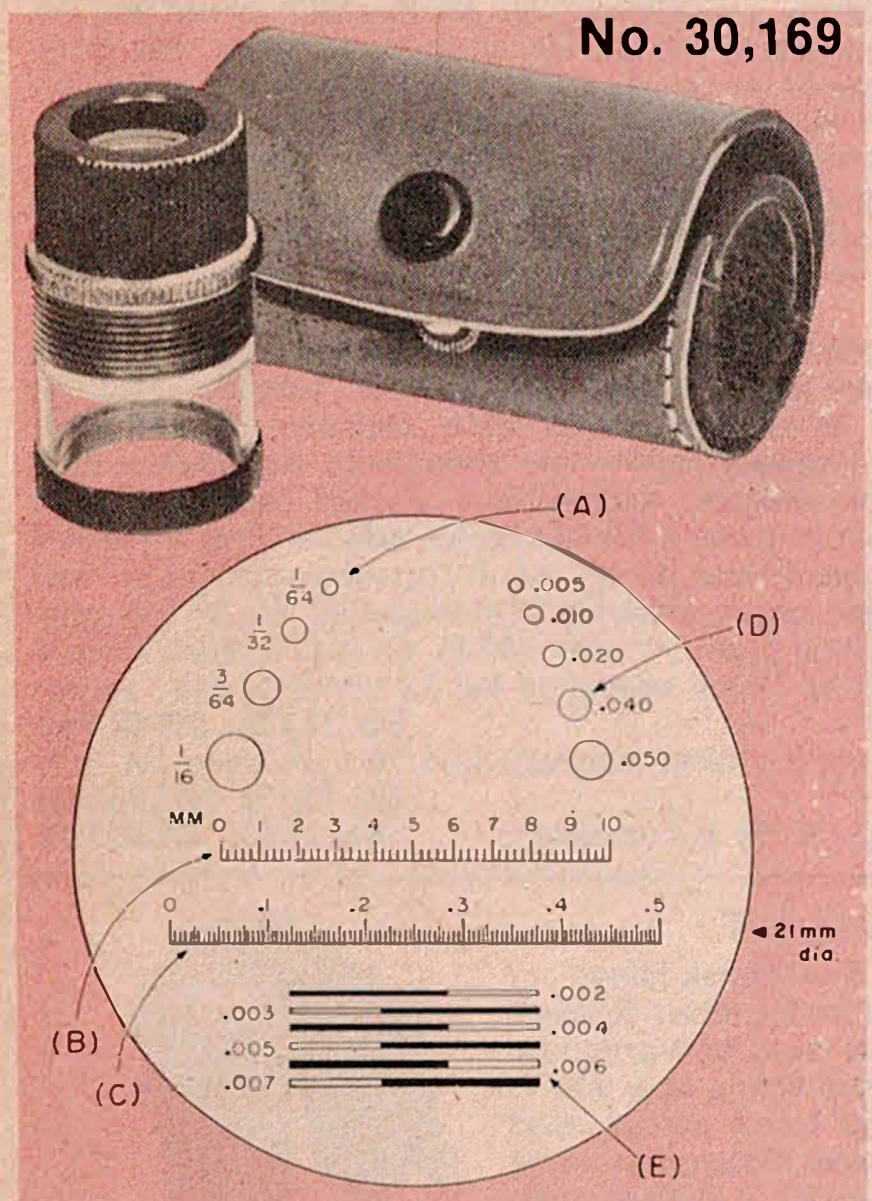
leave hands free for work. Fit most eyeglass frames. Lightweight for comfort (only 2 oz.). Excellent for close working distances. Ideal for work or hobby. Durable; flexible; swing up and down for use; in or out for fine adjustment. Optically correct plastic lenses.

Stock No.	Work Dist.	Power	Price Ppd.
41,729	14"	1¾X	$12.50
41,730	8"	2¼X	$12.50
41,731	6"	2¾X	12.50
41,732	4"	3½X	15.00

COMPARATORS & RETICLES

6X Junior Size Comparator

No. 30,169



- **Measures to .005"**
- **Etched Glass Reticle**
- **Leather Case**

Full 6-Power Magnification!
The Edscorp Junior Comparator is smaller than the one illustrated at left. This model is easy to carry in your pocket or tool chest, because it is only 1-3/4" high x 1" O.D. It has an etched glass reticle instead of a film reticle found on many other pocket comparators. This insures stability, because glass will not bend or warp. Neither is it damaged by oils or solvents. The reticle pattern is filled with pigment which makes it easy to read under magnification.

A special feature of the reticle is the thickness comparison scale (E). A series of parallel lines .002" to .007" apart make it possible to measure visually and directly the thickness of materials such as paper, plastic, gaps between mechanical parts, as well as line widths, etc. Mechanical measurements of such items are sometimes inaccurate because the materials are apt to compress.

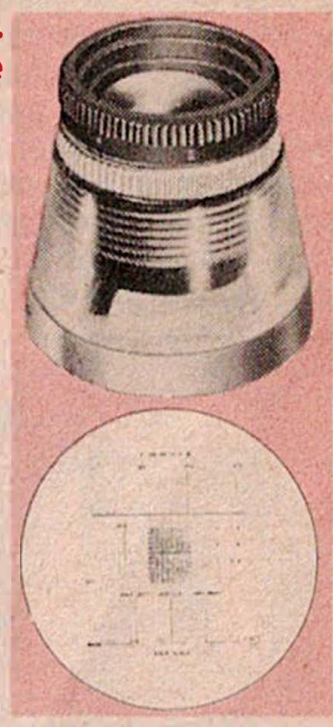
The linear scales are provided both in millimeters (B) and in decimal inches (C). The 10mm long metric scale is divided into units of .2mm. The .5" decimal-inch scale is divided into units of .005". The scales to compare hole diameters read in fractions from 1/64" to 1/16" (A), and in decimals from .005" to .050" (D).

Both the reticle and the object to be measured are magnified 6 times. The optical lens system is free of distortion right to the edge of the field. Cell of transparent Lucite admits plenty of light to reticle and work. Illuminator No. 50,076 (previous page) can also be used with it. The magnifier can be focused and locked to suit individual users. Complete with genuine leather case and instructions.

No. 30,169 $15.50 Ppd.

Reticle Only. As described and illustrated above. 21mm dia. **No. 30,186 $8.95 Ppd.**

Magnetic Ink Comparator . . . With Revised E-13 B2 Reticle



Compare Checks Against American Banking Assn. Tolerances

An important tool in the greatly expanding magnetic ink printing field. Every bank check printer or magnetic code user will find thi. instrument ideal for "go," "no-go" measurements, its small size, 1-5/8" high x 1¼" dia. makes it convenient to carry.

Reticle as illustrated enables user to check character skew, width, coverage, voids, etc. against American Banking Association tolerances.

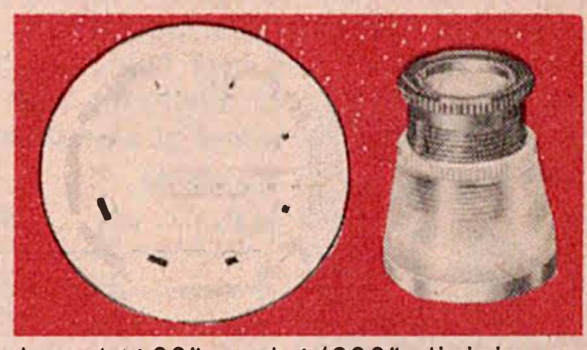
No. 30,285 $27.50 Ppd.

Reticle Only. No Comparator. **No. 30,284 $12.50 Ppd.**
12X Magnifier, as above, with 27mm dia. reticle adapter. **No. 30,177 $15.25 Ppd.**

Note: For greater magnification all 27mm dia. reticles for Comparator No. 30,325 can be used, however, only center portion of field (13mm dia.) is visible.

12X Magnifier with 21mm comparator dia. reticle adapter. **No. 30,178 $12.10 Ppd.**

6X Graphic Arts Comparator For Type, Spacing, Screens



One linear scale measures to 48 points by ½ point. Another, ½" long, has 1/100" and 1/200" divisions. Twelve scales measure halftones from 50 to 200 lpi. Also ¼, ½, 1, 1½, 2, 3, 5 and 6-point blanks. Etched and filled glass reticle, 27mm dia. Clear plastic body, single element lens, focusing threads with lock. 1¾" high.

No. 30,551 $17.50 Ppd.
Reticle only. No. 30,539 $9.25 Ppd.

Check Flaws In OCR Documents With 2 Reticle & Comparator Set

Conform exactly to established ANSI (American National Standards Institute) standards. Now, there's a low-cost way to save time and money in OCR (Optical Character Recognition) operations by detecting improper characters, lines and spacing, etc., before expensive problems and delays occur. For convenient, periodic checking of these critical elements, we offer this set of 2 OCR Reticles (ANSI OCR Standard Sizes I & IV) with a handy, pocket-size, 6X Comparator and Case (see No. 30,325, page 130) . . . all at less than half the price of our competitors.

Both reticles are etched with transparent red ink on 27mm glass discs for quick OCR "go/no go" tests. They feature: a Character Outline Block that indicates maximum and minimum tolerances for outer and inner stroke borders of characters. This set of 2 Reticles with 6X Comparator is an invaluable aid to OCR typists, reader operators, supervisors, forms manufacturers, typewriter service personnel, etc.

2 Reticles with Comparator No. 41,350 $34.95 Ppd.
Size 1 Reticle only. No. 30,642 $11.00 Ppd.
Size IV Reticle only. No. 30,643 $10.75 Ppd.

MAGNETS

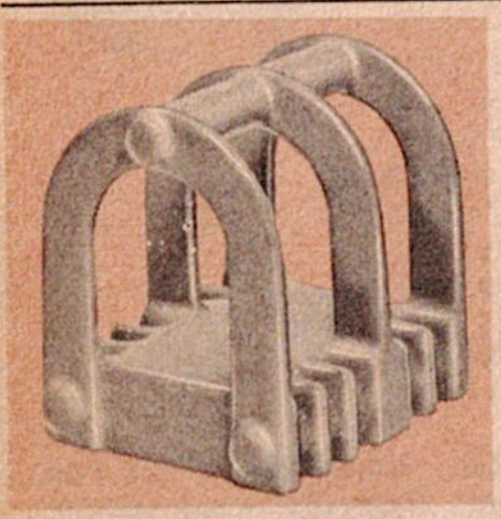
MAGNET HEADQUARTERS U.S.A.!

Bargains . . . from giant magnets to tiny ones, you save from 30-80%. Compare our prices with anyone's, you'll be amazed by how much you save. How do we do it? We buy gov't. surplus, manufacturers overruns, large quantity purchases and pass the savings along to you. These 3 pages offer all sizes and shapes . . . giant horseshoes, alnico, ceramic, rubberized, fixed and adjustable gap, bar, plastic coated, cords, tape, strips, rings, filings, magnetic demonstration kit, and more . . . all at bargain prices.

Save Up To 80%!

Types & Uses of Magnets

Alnico magnets are blends of aluminum, nickel, iron, and cobalt. They are strong and have a high degree of stability. Ceramic magnets are basically ferrites and are very resistant to demagnetization. Magnets have many uses in the home, school, shop, office, and lab. Great for bulletin boards, pick-up-tools, motor construction, games, and they're educational too. Science and physics students study magnetic fields. And what child isn't fascinated for hours with a couple of magnets.



Special design for fantastic strength!

"FISH" With A Magnet

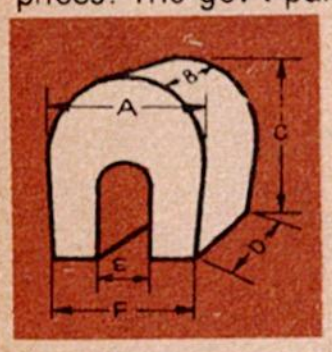
Go treasure hunting on the bottom of a bay, river, lake or ocean. Tie a line to this powerful, but lightweight magnet & drop it over the side. Your "treasure" haul can be anchors, fishing tackle . . . all kinds of ferrous metal valuables. Pick up nails, scrap metal, nuts & bolts from driveways, parking lots, shop floors, etc. Retrieve tools from coolant tanks. This specially designed magnet has 6, stacked, ceramic magnets with steel pole pieces, an aluminum frame & bar-handle for easy carrying. A resilient plastic coating, over all but magnetic face, allows use in corrosive solutions . . . salt water, most acids, alkalis & some organic solvents. Most important, the 3¼" sq. gripping surface has tremendous lifting power . . . over 150 lb. on land & much more in water. 3¼ x 3-7/8" high; wt. 1¾ lb. Group several on bar for conveyor belt "sweeping." Instr. **150 lb. Pull Magnet** **No. 71,135 $16.50 Ppd.**

75 lb. Pull Magnet. As above, but 3 ceramic magnets. 1-11/16 x 3¼" face. Wt. 1 lb. **No. 71,150 $10.25 Ppd.**

75 lb. Pull Magnet. As above No. 71,150, but uncoated. **No. 71,134 $6.50 Ppd.**

Large Horseshoe Magnets . . . War Surplus

You can use horseshoe magnets for many useful, interesting & profitable things . . . ecological clean ups of streams; recovery of lost valuables, motors & anchors in lakes. Magnets can pay for themselves many times over! Remove metal scrap from products. Retrieve tools from dip & coolant tanks. Pick up nails from shop floors. As a vise in workshops. Demonstrate magnetism in school labs. Prices far below normal retail prices! The gov't paid over twice our price! Order from table below (dimensions keyed to diagram). Most horseshoe magnets are Alnico V (high-strength blend of aluminum, cobalt, nickel, copper & iron).



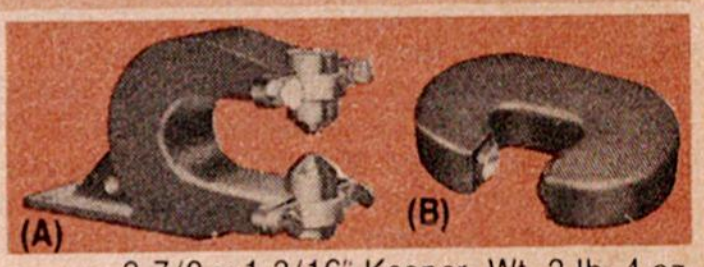
Magnet Wt. (lbs.)	Magnet Size (Inches) (A)	(B)	(C)	(D)	(E)	(F)	lb. lift	Avg. Gauss	Comments	No.	Price
~~5~~	~~3¼~~	~~2¾~~	~~4-3/16~~	~~1¾~~	~~1¼~~	~~2-5/8~~	~~150~~	~~2075~~	~~Best for "fishing"~~	~~70,571~~	~~14.00~~
3½	2¾	2¾	3¼	1-3/8	1¼	2-3/8	40	1700	Alnico V	70,570	11.50
1½	2½	1¾	2-3/8	1-3/8	1-3/16	2-7/16	25	1130	Alnico V	60,215	6.50
3½ oz.	1-9/16	5/8	1-9/16	5/8	5/16	1¼	1¼	810	Pkg. of two; midget	P-40,275	2.50

Our popular 5-lb. surplus Alnico Horseshoe is currently not available. We're searching for more & hope to offer them again soon. Watch future catalog & Edmund magazine ads. Our plastic coated ceramic magnet (No. 71,135 above) is actually stronger & we recommend it highly.

Do Your Own Magnetizing With Gap Magnets

Valuable tools for industry, school shops, labs, assembly lines, etc. Magnetize small tools & other magnets by simply passing them through the gap.

(A) 17-lb. Adjustable Gap Magnet. Magnetic field (flux) adjustable from 1500-3000 Gauss and higher! Gaps up to 1-1/8". 11½ x 6-3/8 x 5". Mounting plate has bolt slots 13/32 x 7/8". (Shpg. wt. approx. 21 lb.) **No. 70,810 $49.50 T.C.C.**



3-7/8 x 1-3/16" Keeper. Wt. 3 lb. 4 oz. **No. 60,461 $12.50 Ppd.**

5-lb. Adjustable Gap Magnet (similar to above). Gaps to 5/7". 3¼ x 3¾ x 4¼". **No. 71,501 $16.50 Ppd.**

(B) Fixed Gap. 1-1/8" gap. Flux at center of gap 1935 Gauss (center of pole surface 3124 Gauss). 5-7/8 x

(C) Bridge Magnet (not illus.). 2" gap; 120 lb. pull; Alnico; good for magnetizing & holding objects for drilling, etc. 3¾ x 3½ x 2½". **No. 70,573 $16.00 Ppd.**

Attention Manufacturers . . . We buy overruns and odd lots of magnets. Send sample stating quantities available to our Bill Dingethal.

Save With Low-Cost Magnetic Sweepers

Easily collect ferrous metal objects from floors, driveways, and parking areas. Nails, screws, metal shavings, nuts, bolts, and chips all are attracted by sweeper's magnetic field. Just roll sweeper over area to be cleaned. Easy handling; quick disposal; 2 widths available (36 and 12"); strong, permanent, ceramic magnets; 4" dia. rubber wheels; wooden base holds magnets in proper orientation for a strong magnetic field; canvas flap for speedy removal of objects picked up. Handle not supplied: sweepers accept standard pushbroom handles. Can be used without handles when mounted on a fork lift truck or over a conveyor. Instr. incl.

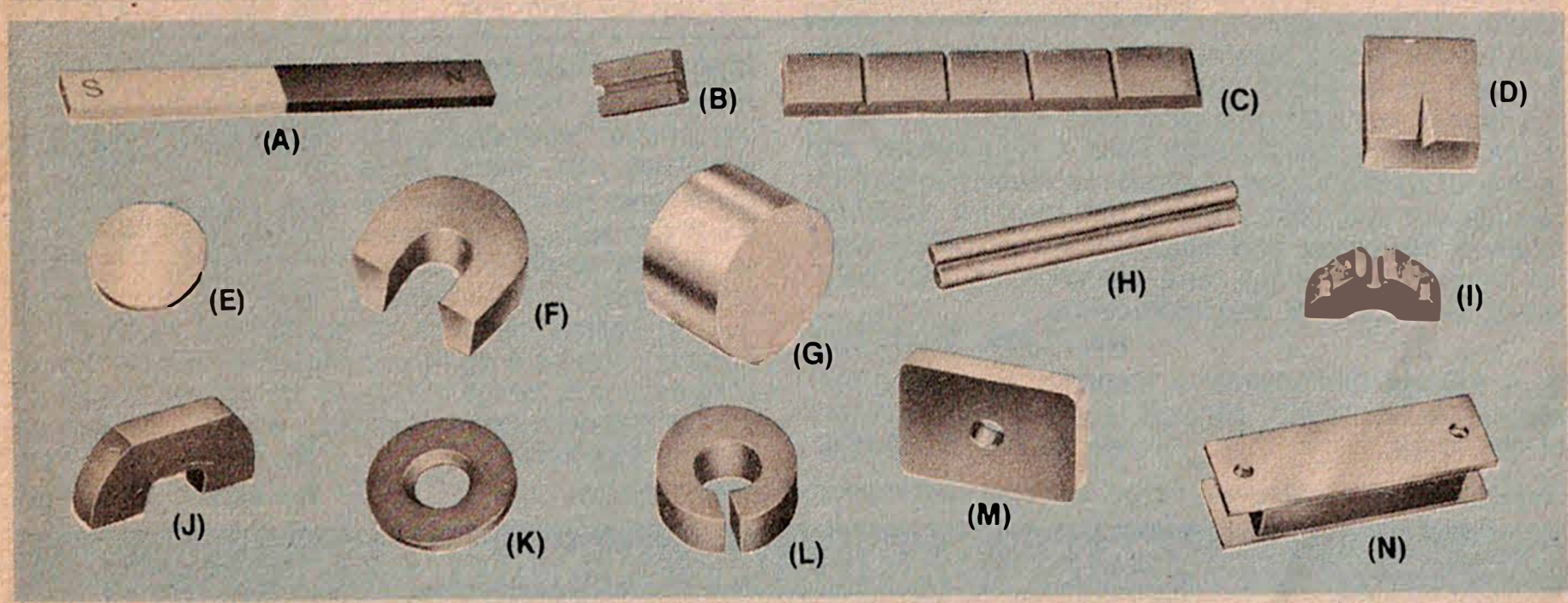
36" Magnetic Sweeper **No. 80,125 $32.50 Ppd.**

12" Magnetic Sweeper **No. 71,153 $17.50 Ppd.**

Big Selection of Alnico & Ceramic Magnets . . . Bargains Galore

In addition to normal uses of magnets (bulletin board, industry, education, etc. see page 34), **medical uses for magnets** have been advocated for many centuries. Many claims were fraudulent, but research is proving that there are some legitimate medical uses. **Biomagnetism** . . . in the last decade, a number of astonishing discoveries concerning plant-magnetic field interactions have surprised even plant physiologists.

Magnet Idea Bulletin . . . crammed full of information, theory, plus normal and unusual uses for magnets. Educational and very informative. **No. 9126 25c Ppd.**



Alnico Magnets . . . blends of aluminum, nickel, iron & cobalt. Strong and stable

(Pix)	Shape	Size	Thickness	lb. lift	Comments	Qty.	No.	Price
(A)	Bar	6 x 3/4"	1/4"	1-1/8	NDEA specs. (CCSSO #2340)	1	40,421	$3.35
	Cast Bar	7/8 x 3/16	1/8	1/8	Has N & S Poles	16	P-40,860	1.60
(B)	Rectangular	1-3/8 x 7/8	11/16	8	Channel on one side	2	P-41,887	2.75
	Rectangular	1-5/16 x 21/32	5/16	3¼	Top curved	4	P-40,961	2.60
	Rectangular	7/16 x 3/16	1/8	1/16	Two corners beveled	100	P-41,667	3.00
(C)	Rectangular	11/16 x 5/8	3/16	15/16	Break off bars	12	P-41,434	1.75
(D)	Square	½ x ½	¼	1¼	Small & powerful	8	P-41,787	2.75
(E)	Disc	1-9/16	9/32	3-1/8	Alnico I	2	P-40,419	3.60
(F)	Horseshoe	1-1/8 x 1-5/16	3/8	1¼	Slanted faces	2	P-40,275	2.50
(G)	Cylinder	7/8 x 55/64	—	1½	11/32" center hole	2	P-41,436	1.40
	Cylinder	2-3/8 x 2-3/8	—	17½	1¼" center hole	1	42,000	7.00
(H)	Cylinder	5 x 3/8	—	7/8	Alnico II—good demonstrator	2	P-60,131	5.50
	Cylinder	1¾ x ¼	—	2-1/8	Centerless ground—Alnico V	2	P-40,418	1.25
	Cylinder	1 x 3/16	—	3/8	Centerless ground—Alnico V	2	P-30,724	1.00
(I)	Bridge	1-3/16 x 43/64	5/16	6	Excellent for bulletin boards	4	P-40,952	2.00
(J)	Bridge	1 x 7/16	3/8	4½	Excellent for bulletin boards	10	P-40,909	3.50
	Bridge	1-13/16 x 7/8	5/16	2	Excellent for bulletin boards	2	P-40,768	1.20
	Bridge	1-7/64 x 5/8	53/64	2	Excellent for bulletin boards	2	P-41,997	1.50
(K)	Ring	1	5/32	½	1/4" hole—mag. across dia.	8	P-40,846	2.00
(L)	Ring Gap	1-7/32	7/16	3	1/8" gap, 7/16" hole	4	P-40,964	2.35
	Ring Gap	1-7/32	½	3	7/16" gap, meter magnet	4	P-41,998	2.50

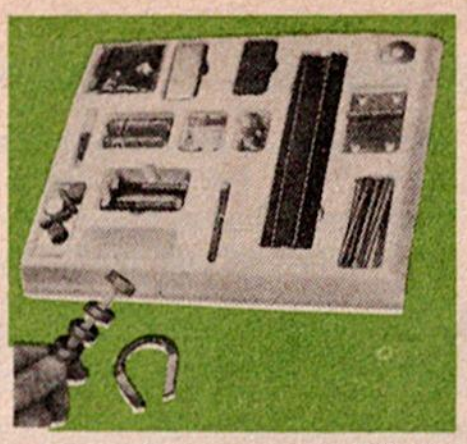
18-pc. assort. approx. 18-oz. ..... **No. 60,581 $ 4.00 Ppd.**
3-lb. assort. Above set plus similar ones. ..... **No. 70,827 $10.00 Ppd.**

See page 18 for new Alnico Painted Magnets.

Ceramic Permanent Magnets are basically ferrites. Made from oxides of iron & other chemicals, they are very resistant to demagnetization.

(M)	Rectangular	1 x ¾"	3/16"	1/8	3/16" center hole	10	P-40,637	$1.25
	Rectangular	1 x ¾	3/16	1/8	3/16" center hole	100	P-60,347	9.75
	Rectangular	1-7/8 x 7/8	3/8	3-5/8	No hole	2	P-41,798	1.25
	Rectangular	1-7/8 x 7/8	3/8	3-5/8	No hole	12	P-41,799	6.50
(N)	Rectangular	1-7/8 x 7/8	3/8	40	4 pole pieces included	2	P-40,818	2.00
	Rectangular	1-7/8 x 7/8	3/8	40	24 pole pieces included	12	P-60,528	9.75
(E)	Disc	3/8	1/8	1/16		25	P-41,986	1.00
	Disc	3/8	1/8	1/16		100	P-41,987	3.25
	Disc	½	3/16	1/8		25	P-40,820	1.50
	Disc	½	3/16	1/8		100	P-40,819	5.00
	Disc	13/16	1/8	1/8		25	P-41,992	2.50
(G)	Cylinder	3/4 x 11/16	—	9/16	¼" center hole	2	P-40,555	1.60
(K)	Ring	½	1/8	1/8	¼" center hole	25	P-41,990	1.60
	Ring	½	1/8	1/8	¼" center hole	100	P-41,991	5.25
	Ring	1-1/8	1/8	3/8	¼" center hole	10	P-41,988	1.20
	Ring	1-1/8	1/8	3/8	¼" center hole	100	P-41,989	9.50
	Ring	1½	3/16	5/8	9/16" center hole	4	P-40,869	1.50
	Ring	2-3/8	¼	1-5/8	1" center hole	1	40,482	2.25

Magnetic Science Kit



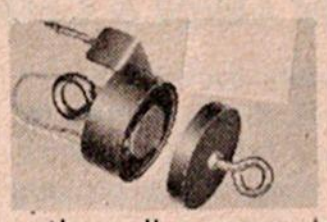
- **Floating Magnets**
- **Electromagnet**
- **A Great Teaching Aid**
- **Fun At Home**

Study the mysterious force of magnetism. Here, in one compact kit, is an assortment of materials useful in experimenting and understanding the principles of the magnet. Working with the kit and its comprehensive but easy-to-read guidebook, you perform experiments in polarity, lines of force, demagnetization, even build a slug rejector and powerful electromagnet. Perform so many hours of investigations and make learning fun! Ideal for classroom study of magnetism and electricity. Kit includes 6 types of magnets, iron filings, wire, batteries, assorted hardware, the guidebook, and instructions.

No. 71,825 $10.95 Ppd.

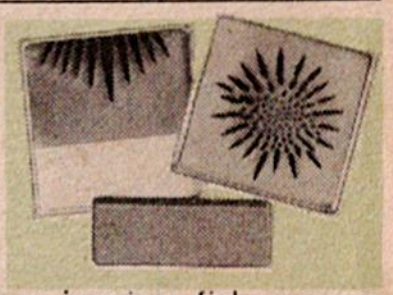
Iron Filings Demonstrate a magnetic field using our magnet (A) No. 40,421, page 35, and our 1-lb. package of iron filings. **No. 60,176 $1.80 Ppd.**

Experimental Electromagnet



Lifts to 100 lbs. with 1½-volt flashlight battery. Turn battery current on and have a powerful magnet; disconnect battery lead and magnetic pull ceases. Instructions outlline 6 experiments. DC magnet and yoke assembly, battery holder, leads, clips and eye-bolts. Faces of steel core and yoke. About 2½" dia. 4½" long, 2 lb. **No. 60,435 $15.25 Ppd.**

Magnetic Fluid Doodler

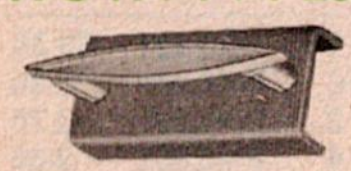


A mysterious mind-challenging pocket laboratory that stimulates new ideas! Place the magnet (¾ x 1") near the 2 x 2" Cell and . . . you create an endless variety of motions and shapes . . . liquid spikes, swimming fish, waves, fluid in motion, defiance of gravity and much more. Doodler contains a non-toxic magnetic fluid (as one of 2 liquid layers) which produces an optical display of unseen magnetic fields. Pacifying, educational, and intriguing. Incl. instr. **No. 41,425 $2.25 Ppd.**

Lodestone Natural Magnet. Large, selected specimen of magnetic iron ore. **No. 40,471 $1.25 Ppd.**

SPECIAL BARGAINS IN MAGNETS

WOW! . . . 25 lb. PULL!

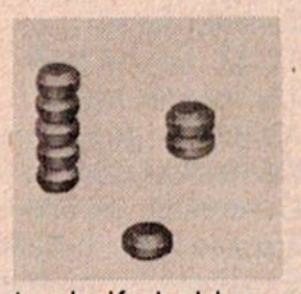


Channel Magnet With Handle

25-lb. pull holds maps, charts (even corrugated cardboard) to ferrous surfaces. Oriented ceramic magnet bonded inside U-shaped channel with attractive, gold-finished handle. 3-1/8" long.

No. 40,847 $2.50 Ppd.

Inexpensive Ceramic Disc Magnets



Low-priced ceramic magnets that every child in the class can have fun with demonstrating magnetic attraction and repulsion. In the home, you'll think of dozens of uses: on bulletin boards, for pot holders, as tool or knife holders, for magnetic games, etc. Each magnet (¼ x ½" dia.) weighs .123 oz. and has a lift of 2 oz.

Pkg. of 25 **No. P-41,761 $1.00 Ppd.**
Pkg. of 100 **No. P-41,762 $3.00 Ppd.**

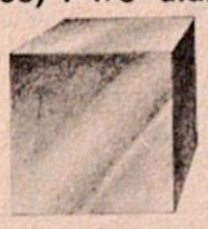
Rectangular Ceramic Magnets

Oriented magnet w/pole pieces lifts 40 lb., without, 3 lb. 10 oz. 7/8 x 1-7/8 x 3/8". Quantity prices? write Bob McKelvey.

Pkg. of 2 w/4 pole pieces **No. P-40,818 $2.00 Ppd.**
Pkg. of 12 w/24 pole pieces **No. P-60,528 $9.75 Ppd.**

Floating Magnets Put a lollipop stick through the hole in these ring magnets. Put poles opposite each other and one magnet will float in the air above the other. The basic principle may be used in the "trains of the future." Fascinating to play with. Children love them. Educational.

(25) ½" dia. **No. P-41,990 $1.60 Ppd.**
(100) ½" dia. **No. P-41,991 $5.25 Ppd.**
(10) 1-1/8" dia. **No. P-41,988 $1.20 Ppd.**
(100) 1-1/8" dia. **No. P-41,989 $9.50 Ppd.**



Surplus Bargain
Tiny Powerful Alnico Magnets
½" square, ¼" thick. Lift 1¼ lb.
Pkg. of 8
No. P-41,787 $2.75 Ppd.

UNUSUAL MAGNETIC MATERIALS

Flexible Magnetic Tape

This 1/16"-thick tape is for car dash, medicine cabinet, bulletin board or workshop. One side magnetic, the other adhesive. Roll is 30" long and 1" wide.

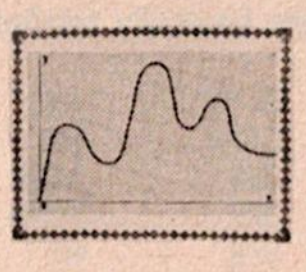
No. 60,208 $1.98 Ppd.

Widths from ¼" to 3" available in quantities of 100 ft. or more. Write for special prices and sizes.

Flexible Magnetic Strip . . . Low as $1.25/ft.

Used in refrigerator doors. Mounts easily, pulls just enough to give a good seal, yet permits easy opening and closing. 1400 Gauss. Strip can be cut into as many as 32 utility magnets. 1-foot lengths in black only.

7/16 x .180". **No. 60,092 $1.25 Ppd.**
19/32 x .250". **No. 60,093 $2.75 Ppd.**



Flexible Magnetic Cord

Clings to any iron or steel surface in most curved shapes. Make easy-to-read graphs! 3/32" dia.

10-ft. **No. 40,875 $2.50 Ppd.**
25-ft. **No. 40,876 $6.00 Ppd.**

6 X 36" FLEXIBLE SHEET MAGNET

Use for temporary signs for autos, etc. Cut up into all kinds of shapes with scissors.

This rubberized flexible material is 1/32" thick. Easily cut with scissors to any shape. Use to hold small ferrous metal parts before assembly. Widely used for making temporary auto signs. Just place on car door and it stays in place.

6 x 36" Sheet **No. 61,011 $9.95 Ppd.**
3 x 3" Sheet, Pkg. of 2 **No. P-40,859 $1.25 Ppd.**

ROCKHUNTING . . . LAPIDARY

Rock collecting and gem making are becoming favorite hobbies of the entire family! Rockhunting is ideal for anyone who enjoys the outdoors. Gem making (polishing inexpensive stones) is great for making jewelry & can be profitable. On the next 3 pages we offer a wide selection of related products for the novice and the old-time rockhound . . . tumblers, books, rocks, abrasives, saws, complete sets, tools, jewelry findings, and accessories.

Tumbling is easy and relatively inexpensive; put a batch of stones in tumbler barrel with water and abrasives of decreasing coarseness and let them tumble. Mount on jewelry findings with epoxy or similar adhesives to make earrings, cuff links, etc. Make table tops and ashtrays. Riflemen find it an easy and efficient way to clean cartridge cases.

Helpful Books

"Tumbler's Guide," R. J. Balej, a manual on all phases of rock tumbling, 7 x 10", 43 pp. **No. 9379 $1.50 Ppd.**

"Pro-Am Guide," A. V. Ridge, tumble grind & tumble polish. A complete guide to tumble-polish gemstones. 7 x 10", 31 pp. **No. 9459 $1.50 Ppd.**

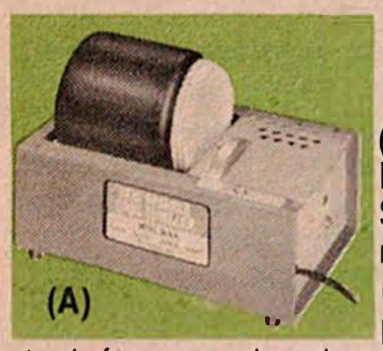
"Gem Cutter's Guide," R. J. Balej, gemstone finishing; physical properties; cuts; etc. **No. 9115 $1.50 Ppd.**

Complete Starter Set . . . Everything You Need

A real rockhound's delight! • Tumble • Polish • Make Jewelry

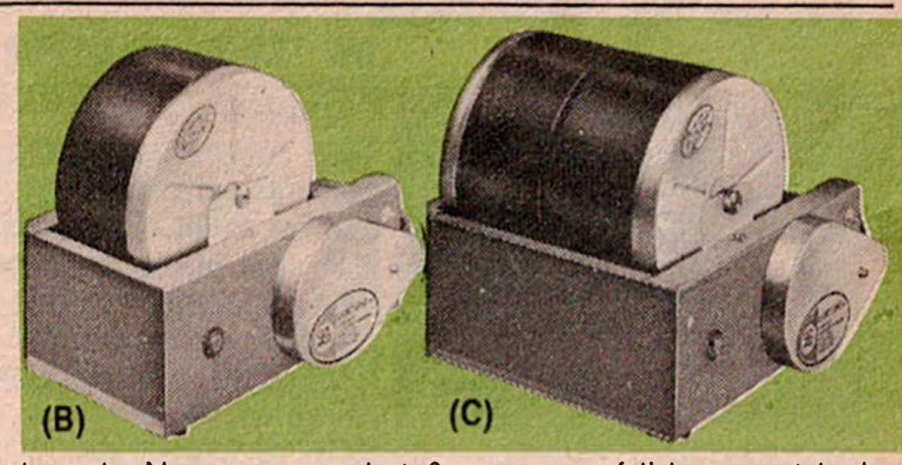
Everything's here to make beautiful gemstone jewelry from rough rock. Make tie tacs, earrings, necklaces, keychains, and more. You get: 2-lb. capacity **Lortone** tumbler; enough abrasive and polish for 6 lb. of rock; jewelry findings; colorful rock mix; epoxy; magnifier; "Pro-Am Guide," and instructions. UL listed tumbler has continuous-duty, fan-cooled motor. A great set to begin your lapidary hobby. **No. 80,210 $24.95 Ppd.**

Fine Lapidary Tumblers By Lortone



(A) 3 Pound Capacity Lapidary Tumbler

Start gem polishing with minimum investment. Heavy duty all rubber barrel with gasket lid; prevents leakage. Heavy gauge steel frame, nylon barrel guide bearings. Continuous duty 115v motor w/belt reduction, drives barrel. 6 x 8½ x 6" high; 4 lb.; inst. **No. 70,874 $12.75 Ppd.**
Repl. Barrel w/lid for above. **No. 71,902 $ 3.50 Ppd.**



(B) 6 Pound Capacity Deluxe Lapidary Tumbler

Rugged, has 6-lb. (4½ pint) capacity barrel that turns at 34 rpm, via its fan-cooled, cont. duty, 1550 rpm motor (115v AC). Quiet, resilient, all-rubber barrel (8" dia. x 4½" deep, ½" wall thickness) has 10 internal sides, gives almost twice tumbling action of conventional 6-sided barrels. Neoprene gasket & warp-proof lid prevent leakage. Quiet, dependable V-belt drive; nylon bearings; safe, covered belts & pulleys; heavy-gauge, steel frame (12 x 8½ x 10" high); rubber feet; 4-ft. cord w/plug. 17 lb. Instr. **No. 80,096 $28.95 Ppd.**
Repl. Barrel For Above **No. 70,981 $9.25 Ppd.**

(C) BIG, BIG 12 Pound Capacity Tumbler

As 6-lb. Tumbler above but with two 6-lb. barrels. Measures 10½ x 11½ x 12½". Wt. 18 lb. Instr. incl. Mfgrs. 1-yr. guarantee. **No. 80,132 $39.95 Ppd.**

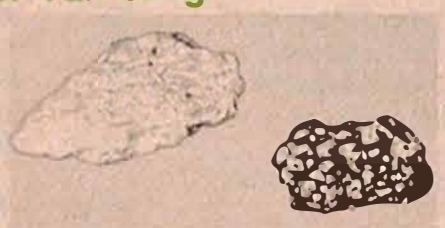
Starter Abrasive Kit. 8 oz. each of coarse, medium & fine grit; 6 oz. of polish. **No. 70,867 $3.25 Ppd.**

NEW . . . "Optical Quality" Lapidary Abrasives

Not normal abrasives, but better first quality, for precision lapidary work (esp. cutting and polishing precious and semi-precious stones). Bulkpacked. Carefully graded silicon carbide: Nos. 80, 320, and 500 grit for normal 4-step tumbling (with Cerium Oxide); No. 36 grit for pre-tumbling exremely rough stones. Boron Carbide, next to diamond in hardness, for cutting and polishing gem stones, lapping tungsten carbide tools, metallurgical specimens, etc.

Grit No.	Type	Oz.	Stock No.	Price, Ppd.
80	Silicon Carbide	8	41,551	$ 1.50
320	Silicon Carbide	8	41,552	1.95
500	Silicon Carbide	8	41,553	1.95
Cerium Oxide Polish		6	41,575	2.75
Kit of Above Material			60,891	8.00
36	Silicon Carbide	8	41,554	1.35
280	Boron Carbide	2	41,555	6.00
600	Boron Carbide	2	41,556	6.00

Hard-To-Find Rocks For Tumbling



We've selected 6 members of the quartz family that are most suitable for lapidary tumblers. Excavated from the Far West, Mexico and South America, these make fine additions to any collection. All are rated between 6½-7 on the Mohs hardness scale, so they can easily be tumbled together. Each ¼-1 oz. sample makes a marvelous specimen when fully polished. Ideal for creating beautiful jewelry; a pleasure to have in any collection. Each bag weighs 3 lb. Prices are Ppd.

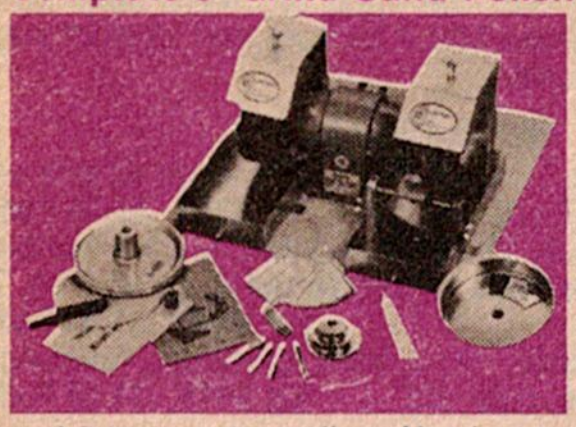
Type/3 lb. Asst.	Description	No.	Price
Texas Agate	Beautiful patterns	41,954	$4.50
Mex. Amethyst	Deep purple	41,955	$7.75
Ore. Jasper	Variety of colors	41,956	$4.50
Brazil Rose Qtz.	Translucent pink	41,957	$4.50
Brazil Green Qtz.	Pale green	41,958	$4.50
Brazil Qtz. Cryst.	Translucent	41,959	$4.50

6-lb. Rock Assortment. 10 Different types: snowflake obsidian, optical quartz, turritella, etc. One identified polished rock of ea. **No. 70,868 $9.00 Ppd.**

Semi-Precious Gem Stone Assortment. 10 Different types: wonder stone, mahogany obsidian, etc. Make cabachons, gems, etc. **No. 41,335 $4.00 Ppd.**

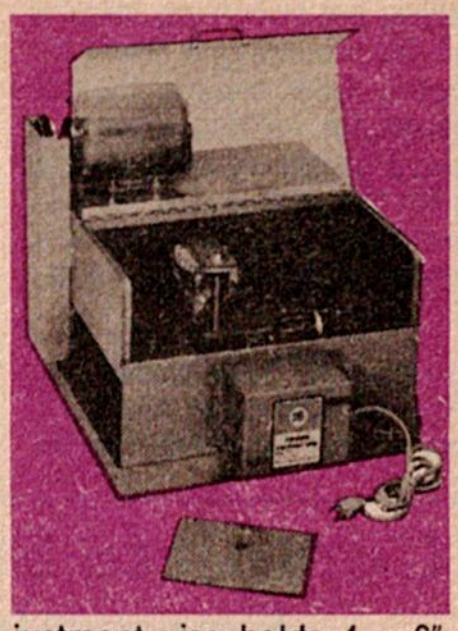
Lapidary Equipment For Serious Amateurs & Professionals

Complete 8" Grind-Sand-Polish Lapidary Unit



All the equipment and accessories to do professional, grinding, sanding, and polishing. This sturdy Lortone unit (GPU-17) features a heavy-duty arbor, versatile splash shields, mounting base and 3-step motor pulley. Also has tool rest, 2 expanding drums, 8 x 1" x (100) grinding wheel, 8" polishing head, 8" leather polishing disc, "Gem Cutter's Guide," wheel cement, dop wax, dop sticks, polish, 5 templates. Set saves you up to $18.00 if you purchased items individually. Designed for maximum convenience and accessibility, the 16½ x 5½ x 7¾" arbor has heavy cast aluminum housing, permanently sealed bearings and is mounted in rubber for quiet. Requires ¼ hp motor (not incl. see below). A money saving package that solves your grinding, sanding, and polishing problems. (Shpg. wt. 43 lb.) **No. 85,228 $79.00 T.C.C.**

¼ hp Split Phase Motor w/cord.
No. 71,879 $31.00 Ppd.

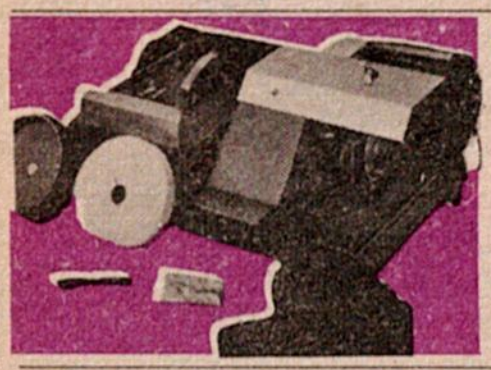


10" Slab Trim Saw

Unlike other 10" saws which are basically trim saws with vises added for slabbing, this Lortone unit (ST-10) is first a slab saw that easily converts to trimming by a drop-in, bolt-down plate that replaces the vise (see illus.). A really sensational unit that features: belt guard for safety, adjustable motor mount; 18½ x 20½ x 12½ heavy-gauge, welded steel case; wing-nut adjustment vise holds 4 x 6" rocks; hinged lift-up clear Lucite cover; interior splash curtain; 2" screw-action feed control, easy-to-install trim platform; removable bottom pan. Requires motor and diamond blade (listed below). With this Slab Trim Saw and 8" Grind-Sand-Polish unit at left you'll have a complete Lapidary workshop to be proud of. (Shpg. wt. 25 lb.)

No. 85,227 $120.00 T.C.C.

¼ hp Split Phase Motor w/cord No. 71,879 $31.00 Ppd.
10 x .032" Diamond Blade No. 71,886 $26.50 Ppd.

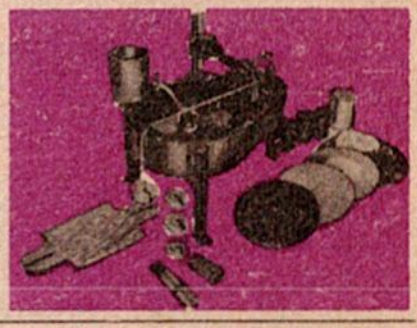


Complete Lapidary Unit—Cut, Grind, Sand, Polish Gems

Turn rough rock into beautiful polished gemstones with one machine. ¾" turned, polished, ground shaft; ¾" ball bearing sealed & lubricated for life, mounted in rubber for quiet. Steel table on trim saw resists abrasion and scoring. Heavy duty, ¼ H.P. split pulse, continuous duty motor. Heavy gauge steel constr. 7 x 19 x 20" wide. Vise attachment to slab rock; 6" dia. diamond blade; 6 x 1" x 100 grit silicon carbide grinding wheel; 6 x 2½" expandable rubber sanding drum; sanding belts; 6 x 1" hard felt polishing wheel; Cerium Oxide polish; dop wax & sticks; template; instr. 110v AC. Shpg. wt. 53 lb.

No. 85,209 $122.25 T.C.C.

10" Gem Maker . . . For Professional Results



Fashion beautiful, faceted gems with this precision-built, simple-to-operate, cast aluminum unit. Gems equal in sparkle and design to those by professionals! Or start your own repair business by mending the chips on expensive crystal. 3-screw adjustable clamp; V-slot; etc. Set incl.: 10" diamond blade; 10" cast iron lamp wheel; 8" grinding, scratch and polishing wheels; 8 oz. grinding & 3 oz. polishing compounds; 3 brushes; dop sticks & cement; soluble oil; test gems; weights; instr. Shpg. wt. 37 lb. Requires 1725 rpm motor and belt. **No. 85,195 $79.90 T.C.C.**

Jewelry Findings . . . Make Your Gemstones Into Jewelry

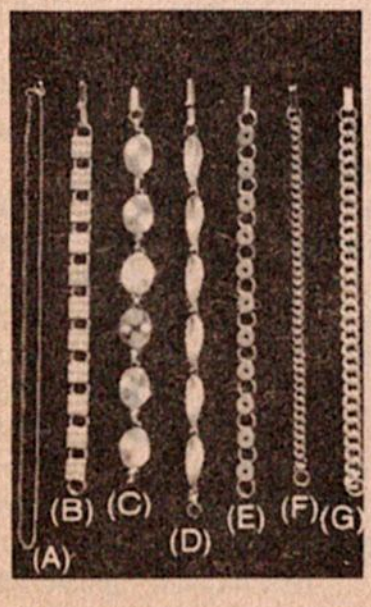
There are jewelry findings and then there are jewelry findings. Some are very cheap, others are expensive. The trouble is that most folks can't tell the difference so a lot of what's sold is poor quality. We've had a lapidary expert select this assortment of gold and rhodium plated findings to be sure its of good quality . . . nice enough to use to make gifts or to sell what you've made. We offer an assortment of every type we sell and each type in dozen lots. Get the assortment so you can get an idea of which types you best like to work with and then order those that you want to use in gifts or sell.

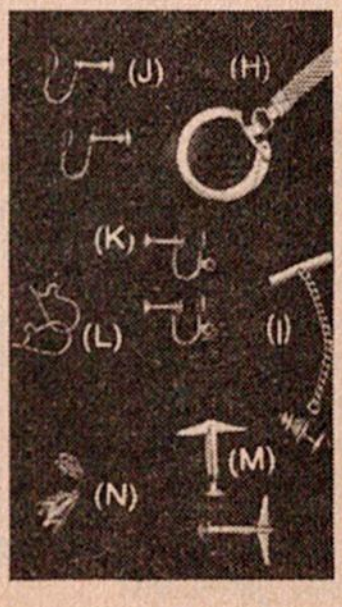
Lôôk Us Over Assortment

A sampling of everything we sell . . . each item in both gold and rhodium plate. You get: (A) 2 neckchains; 12 bracelets, 2 each of style (B-G); 2 keychains (H); 2 tie tacs (I); 6 pairs of earrings, screwback pad (J), drop (K), and pierced wire (L); 2 pair cuff links (M); 12 dozen bell caps (N); with jump rings and 2 bow pins (not illus.).

No. P-42,045 $13.95 Ppd.

• Great Gifts • Fine Quality
• Sell Your Lapidary Art

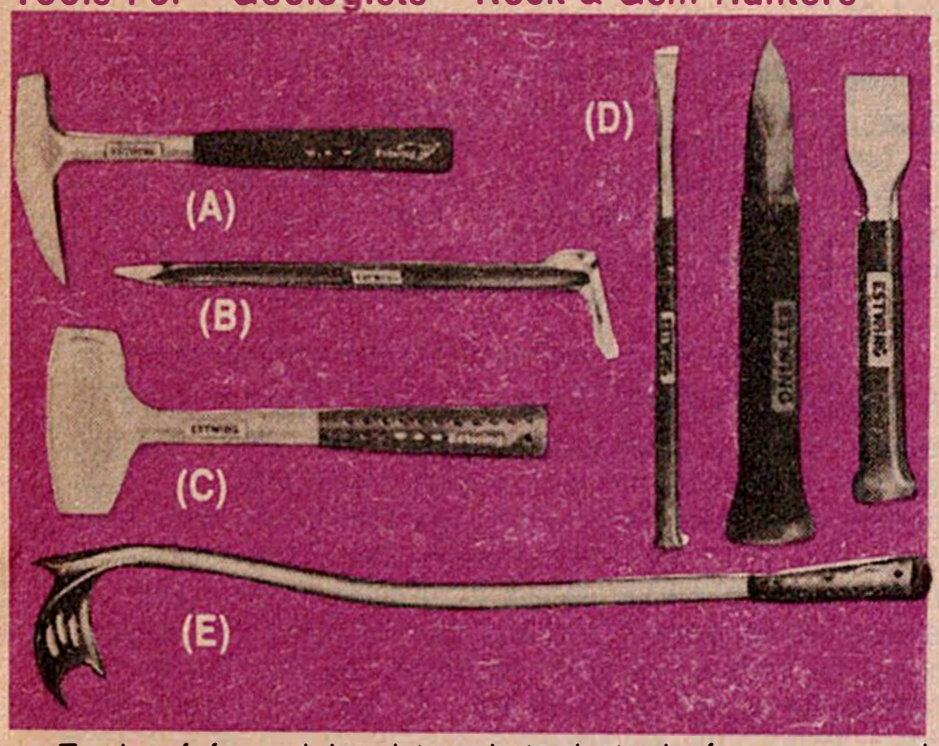




Item Type	Item Description	Pkg. Qty.	Gold Plated No.	Rhodium Plated No.	Price Ppd.
A	Neckchain	12	P-42,046	P-42,047	$4.85
B	Diamond Link Bracelet	12	P-42,048	P-42,049	5.50
C	SunRay Bracelet	12	P-42,050	P-42,051	5.50
D	Leaf Bracelet	12	P-42,052	P-42,053	5.50
E	Donut Link Bracelet	12	P-42,054	P-42,055	5.50
F	Fine Link Bracelet	12	P-42,056	P-42,057	5.50
G	Rope Link Bracelet	12	P-42,058	P-42,059	5.50
H	Keychain	12	P-42,060	P-42,061	3.50
I	Tie Tac	12	P-42,062	P-42,063	4.85
J	Earrings—Screwback Pad	12 pr.	P-42,064	P-42,065	2.95
K	Earrings—Screwback Drop	12 pr.	P-42,066	P-42,067	2.95
L	Earrings—Pierced Wire	12 pr.	P-42,068	P-42,069	2.95
M	Cuff Links	12 pr.	P-42,070	P-42,071	3.50
N*	Bell Caps w/Jump Rings	144	P-42,072	P-42,073	3.50
O	Bow Pins	6	P-42,074	P-42,075	1.85

*Bell Caps and jump rings are necessary to hang gems from findings.

Tools For • Geologists • Rock & Gem Hunters



Tools of forged hard tough tool steel of unsurpassed temper! Shockproof cushion grips (except B).

A. Pointed Tip Picks. 14 oz. **No. 60,848 $7.75 Ppd.**
22 oz. **No. 60,847 $8.50 Ppd.**

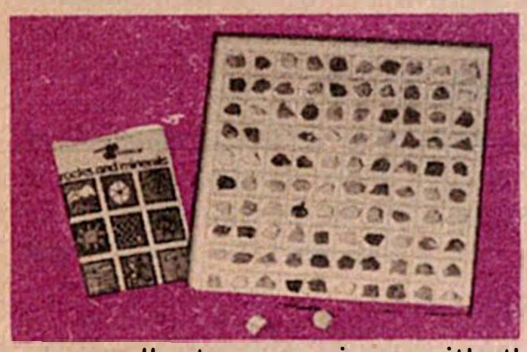
B. 18" Gad-Pry Bar. 2 Hammer faces let you drive bar either way. **No. 60,846 $5.50 Ppd.**

C. Crack Hammers. 2 lb. **No. 60,845 $7.95 Ppd.** 3 lb. **No. 60,849 $8.25 Ppd.** 4 lb. **No. 60,850 $9.50 Ppd.**

D. Chisels. Splitting, 1¼ x 8". **No. 41,395 $4.25 Ppd.**
For Wedging/Prying. 5/8 x 9". **No. 41,396 $4.25 Ppd.**
For pockets, ½ x 12". **No. 60,844 $2.50 Ppd.**

E. 16 oz. Gem Scoop. Raking prongs & spur for safe walking. Rustproof; 36" long. **No. 80,149 $8.95 Ppd.**

100 U.S. Rocks And Minerals, Plus Manual

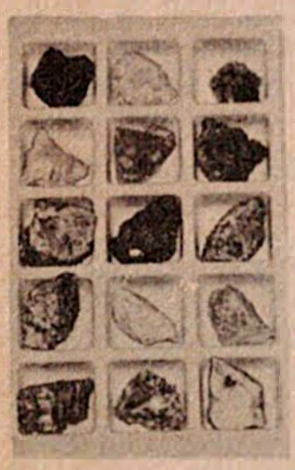


Fine introduction to rock collecting, this set of U.S. rocks and minerals contains volcanic tuff, satin spar, petrified wood, jade, gold ore, and 95 other different specimens in natural state. Provides an excellent comparison with those found in the field. Incl. 67-page book, "Introduction to the Study of Rocks and Minerals" which gives locations and facts about over 170 rocks and minerals.

No. 71,176 $14.25 Ppd.

36-Specimen Set with book. **No. 40,329 $5.00 Ppd.**

15-Piece Fluorescent Mineral Set



A fine addition for any collection. 15 unique specimens from across the country give a broad view of fluorescent mineral reactions. The 15 mineral samples (1-1½" dia. each) range from N. J. and N. Y. to Calif. and from Canada to New Mex. Excellent fluorescent brilliance under ultraviolet light (some glow under longwave, others under short-wave). Identified as to mineral and location.

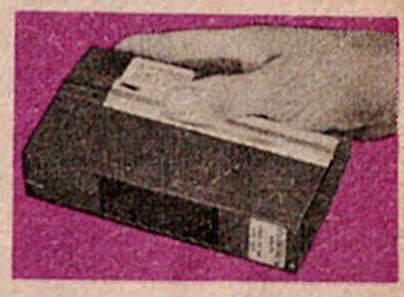
No. 71,802 $8.95 Ppd.

BLACK LIGHT YOUR SPECIMENS

High-Intensity, Long-Wave UV Lamp

Ideal for examining mineral specimens. Semi-portable; lamp has 8-ft. cord and can be hand-held or used on metal transformer base (6½ x 5¼ x 7¼"). On-off switch, 3-wire cord, adapter; 100w, mercury-arc, bulb (3,000-hr. life); 5" roundel filter. Uses 110-125v AC. Wt. 16½ lb. **No. 70,713 $129.75 Ppd.**

MINERALIGHT®



This lightweight (1½-lb.), transistorized UV lamp emits long and short waves simultaneously or long waves separately. Runs 45-60 min. on one charge. Ni-Cd battery & 115v AC recharger incl. Recessed switch. No cords or electrical outlets needed. Case, 6¼ x 4 x 1½", of high-impact plastic with aluminum battery cover. **No. 41,067 $89.50 Ppd.**

Low-Priced, Long & Short Wave Unit

Dual wavelength lamp with complete one hand operation. Each lamp has its own switch for independent operation. Separate filters for peak transmission at proper wavelengths with little visible light transmission. Operates on 115v AC; portable when used with battery adapter case (requires 2 "B" batteries). Shortwave 2537A. long wave 3660A Well made Minerals & 60-pg. booklet incl **No. 70,259 $39.95 Ppd.**
Battery Adapter Case **No. 70,260 $12.95 Ppd.**

Black Light With Specimens

Identify minerals, U.S. tagged stamps, etc. Short-wave lamp, with filter that converts it for safe, long-wave use, activates almost 90% of all fluorescent materials. 2¼" dia. x 4¼" lamp includes transformer (110v AC); cord; filter; stamp; 4 minerals; 2 manuals; etc. **No. 70,712 $19.75 Ppd.**

UNUSUAL SPECIMENS

Meteorites from outer space! 40,809 is Octahedrite from Odessa, TX; others: Canyon Diablo area of AZ.

Stock No.	Size	Approx. Wt.	Price Ppd.
40,809	Small	¼-½ oz.	**$ 4.25**
40,979	Small	¼-½ oz.	**15.00**
40,978	Medium	½-¾ oz.	**25.00**
40,977	Large	1-1½ oz.	**35.00**

Trilobite In Matrix. Exquisite specimen of this extinct marine arthropod from the Cambrian Period (450 million years ago.) **No. 40,806 $1.50 Ppd.**

Fossil Collectors Bonanza
30 fossils! 10 from animal and plant life from Cretaceous, Jurassic, and Pennsylvania ages; 10 excellently preserved specimens (brachipod, worm burl, cronoid stem, etc.); plus 9 animal fossils and one piece of petrified wood from the Lower Cretaceous period 120.000.000 years ago **No. 50,344 $3.90 Ppd.**

Illustrated Rockhunting And Gem Books

(A) 4 books describe and locate productive U.S. collecting areas. 5¼ x 8¼"; about 80 pp; pprbk.

"Eastern Gem Trails" by Oles. **No. 9111 $2.00 Ppd.**

"Midwest Gem Trails" by Zeitner. **No. 9112 $2.00 Ppd.**

"Desert Gem Trails" by Strong. Mojave & Colorado Deserts, & adjacent Nevada. **No. 9113 $2.00 Ppd.**

"Handbook of Jade" by Hemrich. **No. 9114 $2.00 Ppd.**

(B) "Rocks and Minerals." A basic introduction. 4 x 6"; 160 pp; pprbk. **No. 9417 $1.50 Ppd.**

(C) "The Book of Agates & Other Quartz Gems" by Quick. 7½ x 10½"; 232 pp; hrdbk. **No. 9414 $9.95 Ppd.**

(D) "Gemcraft: How To Cut & Polish Gemstones." 7½ x 10½"; 189 pp; hrdbk. **No. 9412 $7.50 Ppd.**

(E) "Step-By-Step Jewelry" by T. Gentile. 10 projects. 8¼ x 11¼"; 96 pp; pprbk. **No. 9418 $2.50 Ppd.**

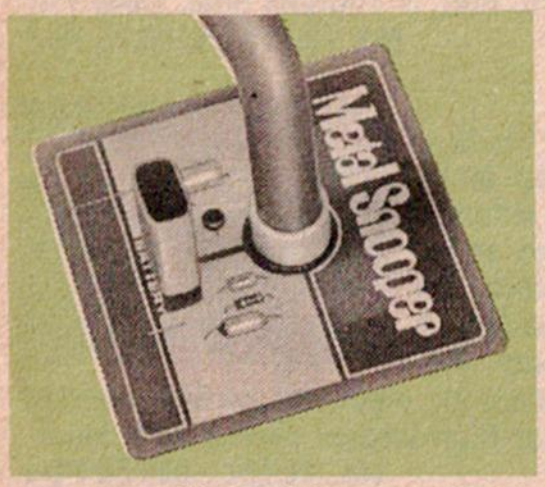
TREASURE HUNTING

. . . for fun and profit! A successful treasure hunting hobby can be exciting and rewarding. No matter where you live . . . by sea or mountain, near desert sand or solid clay . . . we have a metal detector to suit your needs . . . to fit any price range. There are many places to explore . . . sites of old towns, mines, battlefields, dumps near old homesites, at the beach, river banks, forts . . . even your own backyard can yield surprises. With a little research you'll find places others have completely missed. Coins, historical relics, old firearms, jugs, antique bottles, minerals, jewelry, silver & gold are yours for the finding!

Types Of Metal Detectors

Beat Frequency—Indicate a "find" by a change in audible pitch. Good low-priced unit for beginning treasure hunting and coin shooting.

Transmitter Receiver—Inductive balance system that indicates a "find" by a change in signal intensity. As prices go up, so does sensitivity. Better for specific types of treasure.



Close-up View of Locater Head

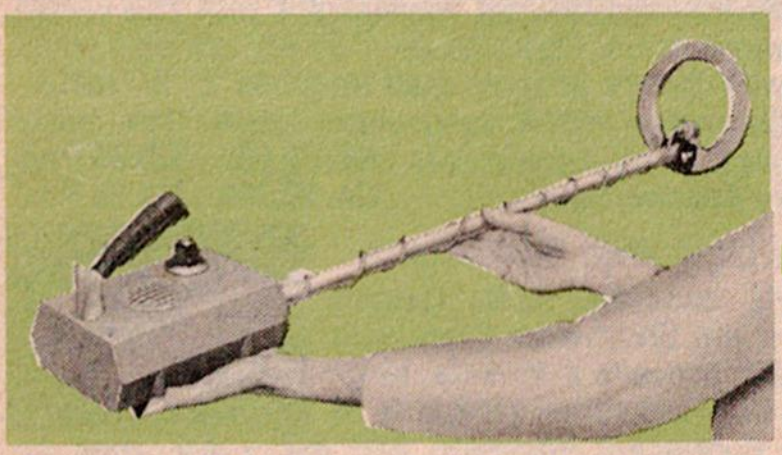
Lowest Priced METAL LOCATOR perfect new hobby "starter unit"!

Here is a beginner's treasure finder at a low-budget price. This unit's rugged, lightweight (10-oz.) construction gives hours of fun and profit with minimum operator fatigue. The Locator (miniature transmitter) operates along with your portable AM transistor radio (not incl.), eliminating costly extra circuitry which increases the cost of most metal detectors. When it detects metal object or metal bearing element, a clear signal comes from the carried transistor. An adjustable 39" long plastic handle adds to detector efficiency by decreasing the amount of metal in the immediate search-coil field area. 9v transistor radio battery required (not incl.) Instr. Note: This low-priced unit nowhere as efficient or professional as our top-quality Metal Detectors (below), but it's perfect for beginners. **No. 71,395 $14.95 Ppd.**

Metal Locator With Radio ... No. 71,436 $19.95 Ppd.

Top Quality Beat Frequency Metal Detectors

• Featherweight! • Good Buys! • Good Hunters!



These fully transistorized detectors are a great new find. We're really impressed with their quality, performance, and overall value. Each has a durable plastic case, aluminum stem, 6" waterproof searchcoil, vinyl hand grip, and operates on a single 9v transistor battery (incl.). All locate through sand, wood, dirt, and water* with no loss of power. Include easy instr., 5-yr. manufacturer's guarantee and 57-pg. "Treasure Guide To 101 Treasure Sites". *Detects underwater if electrical contact at loop is protected with silicone rubber sealant. Don't submerge control box.

Low-Cost Metal Detector . . . Only $39.95

A five-transistor model that finds a penny at 5" or a bag of coins at 18". Comes complete and ready to go. Easy to use, it detects sharply with "sound off" loud speaker. One tuner control; perfect balance; lightweight; 3 lb. **No. 80,175 $39.95 Ppd.**

Searcher Model . . . 10 Transistors

This 10 transistor detector is great for finding hidden treasure. Clear tone loud speaker with ultra sensitive tone control allows high performance to 20 in. with particular sensitivity for small items. Easy to operate vernier dial keeps the detector accurately tuned at all times. Automatic null compensator assures stable tone for detecting fringe items. Aluminum stem adjusts from 18-30". Wt. 3 lb. **No. 80,181 $71.00 Ppd.**

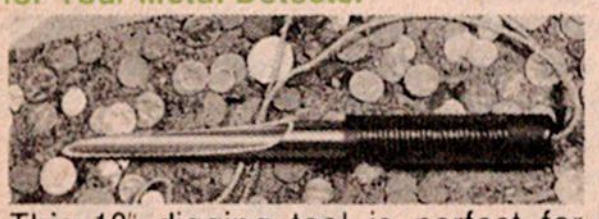
12 Inch Search Coil For 80,181 & 80,182

Provides greater range and depth. Many use both coils to be sure no area is missed. **No. 71,721 $15.75 Ppd.**

Super Searcher Model

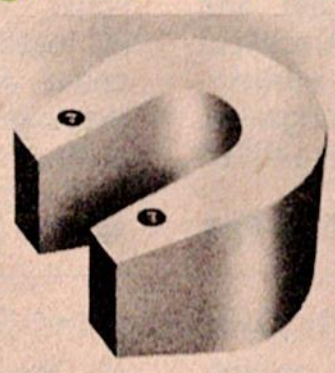
Gather your treasure with this 16-transistor beauty. Advanced precision tuning system eliminates drifting. Sensitivity selector controls the search coil to pass over worthless trash and pick up larger items. So sensitive you can detect a bullet at 5 in. and a chest of gold at over 6 ft. Loudspeaker and view meter lets you detect visually, or with sound or both. Has test button for instant battery check on view meter; automatic null compensator; vernier dial. Our engineering staff is raving about this versatile detector. Stem adjusts from 18-30 in. Weight 4 lb. **No. 80,182 $121.50 Ppd.**

Coin Shooter—The Perfect Mate for Your Metal Detector



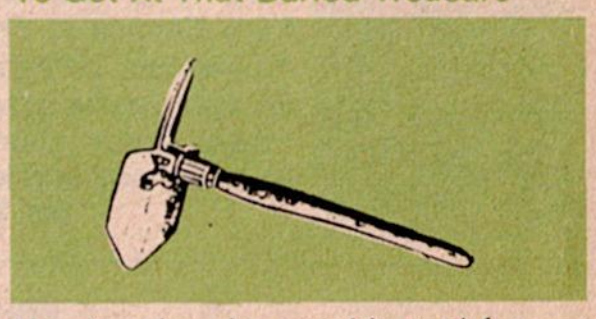
This 12" digging tool is perfect for recovering lost coins and jewelry without digging unsightly holes. Saves time too. Readily accepted for use in parks and play grounds, this light weight (5 oz.) aluminum digger is tough enough to probe the ground, yet will not damage those precious coins. Comes with plastic handle and belt cord.
No. 60,998 $4.95 Ppd.

A Magnet For Prospectors!

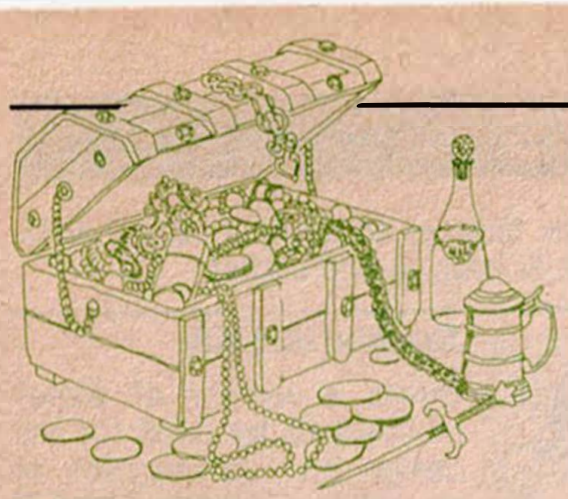


Powerful horseshoe magnet is easy to take along on any treasure hunt. This type of permanent power magnet is ideal for separating black magnetic sand from gold. Wt. 1½ lb. **No. 60,215 $6.50 Ppd.**

Combination Pick/Shovel To Get At That Buried Treasure

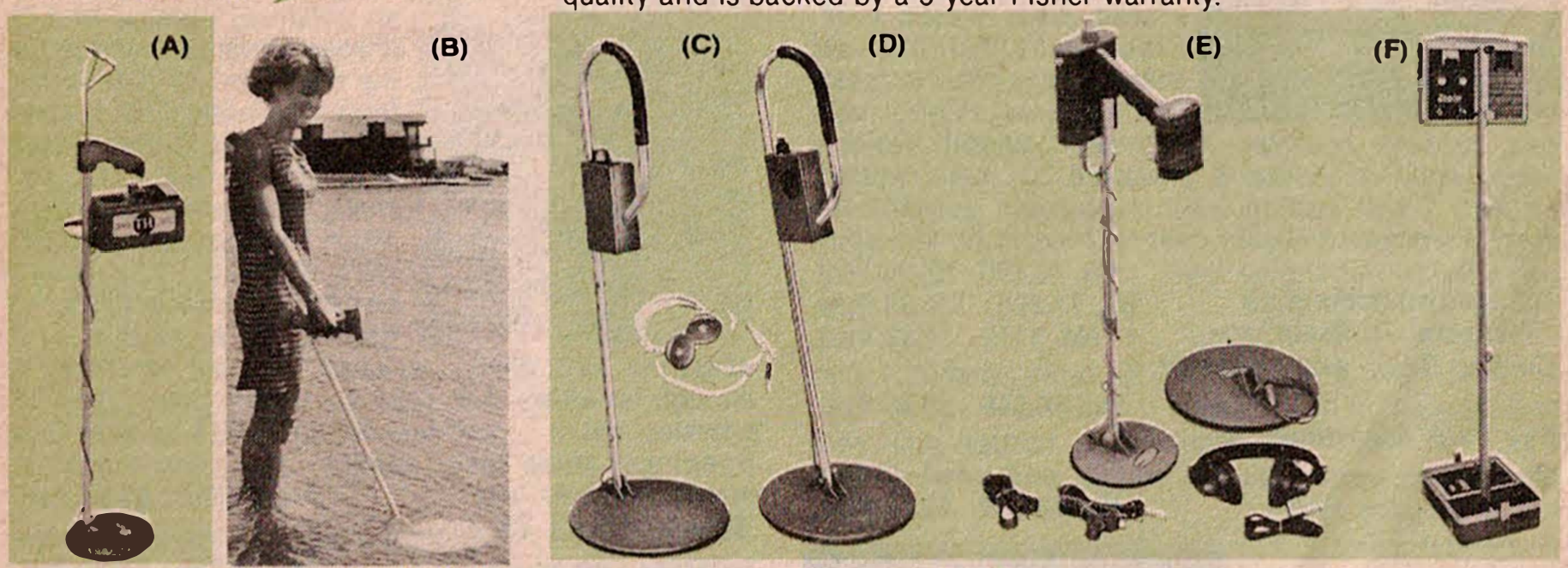


Here's a handy portable tool for you treasure hunters. This army surplus 2½ lb. pick and shovel is great for uncovering finds in those hard surfaced areas. Chop away with the pick, then dig out with the shovel. Folds up for backpacking approx. 20" long. **No. 80,196 $4.50 Ppd.**



Famous Fisher Metal Detectors

Fisher Research Laboratory started in the 1930's, when Dr. Gerhard Fisher invented the electronic metal detector and radio direction finder. This started a tradition of excellence that has kept Fisher the "Cadillac" of transmitter-receiver detectors for over 40 years. Each unit is of the highest quality and is backed by a 5-year Fisher warranty.



A. TH Pro—Supersensitive Induction Balance System

This new model is designed for fatigue-free, sensitive operation. The superb balance and comfortable stainless arm rest let you search level ground, walls, ceilings, even water without tiring. Maximum penetration and fast electronic response are provided with the unique Fisher Isocon waterproof search heads (6"). An electrostatic shield reduces ground effects through widely varying water and soil conditions. Features: headphones, built-in loudspeaker, signal intensity meter, walnut grip, adjustable stem, volume control, balance knob and battery check. Range: 6 in. to 4 ft.

No. 80,204 $189.50 Ppd.

B. Metalert 70—Streamlined For Treasure Action

The world's favorite lightweight instrument for treasure hunters, archeologists, collectors and beachcombers. Waterproofed search coil (11") is great for fresh or salt water (up to 30"), and will also locate under soil, rock, cement, snow, or ice. Stainless steel armrest makes for tireless operation, adjust. aluminum shaft (25-40"); soil conductivity knob; wide-view meter; moisture-proof controls. Audible indication in incl. headset. 9v battery (incl.). Wt. 3½ lb. Small objects to 20"-large to 4 ft.

No. 80,134 $169.00 Ppd.

C. Orion 120—The Mighty Hunter

This carefully constructed instrument comes with an 11" waterproof search coil, 32" curved aluminum handle and rubber hand grip. The "find" is indicated by an audio tone which is heard through the included headset. Runs on 9v battery (incl.). Wt. 4 lb. Small objects to 6"—large to 4 ft. **No. 80,151 $109.50 Ppd.**

D. Orion 121

The same great features of the 120, plus a built-in speaker with independent volume control and a higher sensitivity range. **No. 80,152 $134.50 Ppd.**

E. Explorer II . . . The Best . . . 2 Search Heads

Not one, but two . . . two in one! This treasure hunter can be used as a single unit with the electronics attached to the handle, or as a double unit by detaching and carrying the electronics pack safely and comfortably with a strap over the neck and back. This allows the search coil to be submerged deep in fresh or salt water, or raised higher against walls and ceilings. So sensitive, it detects small objects at depths of 4-8 in. and can still find a treasure chest to 4 ft. This anodized gold beauty features a carved walnut handle, telescoping rod, both 6" and 12" waterproof search coils, and leather neck and waist straps. The laminated aluminum electronics housing includes a built-in response meter; volume, coarse and fine tuning, controls, and battery check. Signal heard through built-in speaker or stereo headset (incl.). (2) 9v. batteries (incl.) **No. 80,203 $299.50 Ppd.**

F. Gemini For Finds Deep Below The Surface

This compact, rugged detector is designed especially for locating gold, silver, metallic objects, and ore from 1 to 22 ft. This deep penetration is made possible by separating the transmitter and receiver with the long aluminum handle. Enclosed in a sturdy thermoplastic case, the transmitter and receiver each run on a 9v. battery (incl.) and snap neatly together when not in use. Incl. "On-Off" switch, (2) battery test buttons and meters; built-in speaker; sensitivity control; Hi-Lo power selector switch (to control depth sensitivity); detachable aluminum handle; leather straps. Wt: 13 lb. Size: 18¼ X 11¾ X 15". **No. 80,202 $239.50 Ppd.**

"Treasure Hunter's Manual"

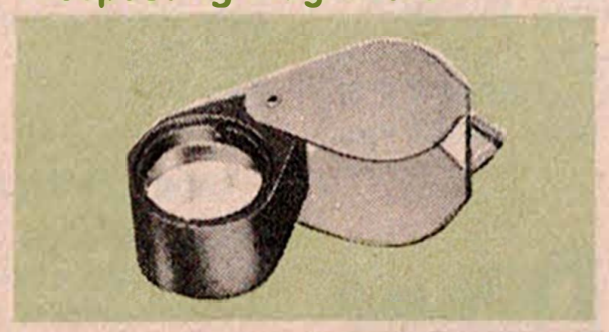
Karl Von Mueller, an old master of treasure hunting, has written a complete guide to this fast growing pastime. From his vast experience you get all the details on research techniques, detector operation, legality, gold dredging and more. Paperback with many photos, 292 pages.

No. 9458 $6.50 Ppd.

"Treasure Hunting"

Fillman Bledsoe, one of our famous treasure-hunting customers has compiled a 32 pg. fact-filled book loaded with detecting facts and hints. **No. 9125 $3.00 Ppd.**

Prospecting Magnifiers



These pocket magifiers are great for close-up examinations on treasure hunts. Flat field, no distortion, sturdily mounted in metal case.

10X Hastings Triplet
No. 30,344 $10.50 Ppd.

8X Doublet No. 40,029 $5.00 Ppd.

Charge The Ground With Our Surplus Generator!

Here's a great idea from another treasure hunting customer. Take this 100v generator, attach (2) 12-ft. leads, attach (2) metal rods on the other end and insert, in the ground. Crank the generator and it electrically charges all metallic objects in the area, This makes them easier to locate. Size: 3-1/8 x 4-1/8".

No. 50,225 $8.50 Ppd.

HOBBIES AND CRAFTS

Everyone should have a hobby . . . for fun, study, and profit . . . it's healthy and entertaining!

Edmund Scientific Co. features all types of helpful items for normal and unusual hobbies and crafts!

Embed Almost Anything

Shells, coins, leaves, preserved zoological specimens, pictures, etc., within a solid, clear plastic form. Create beautiful, unusual shapes & designs. No mess. Add hardener. Plastic resin gels, hardens, becomes crystal clear, smooth. Objects permanently embedded & preserved. No heat needed. Kit incl. 1 pint casting resin; 1 reusable polyethylene mold; hardener; 3 mixing cups; stirring rods; ball point pen & holder; fishing fly; instr. **No. 70,896 $5.90 Ppd.**

Deluxe Embedment Kit **No. 71,820 $14.95 Ppd.**

"Treasures In Resin", 60pp. **No. 9119 $2.98 Ppd.**

Casting Resin and Hardener. Kit replacements; 1 pint casting resin, ¼ oz. hardener. **No. 60,646 $3.00 Ppd.**

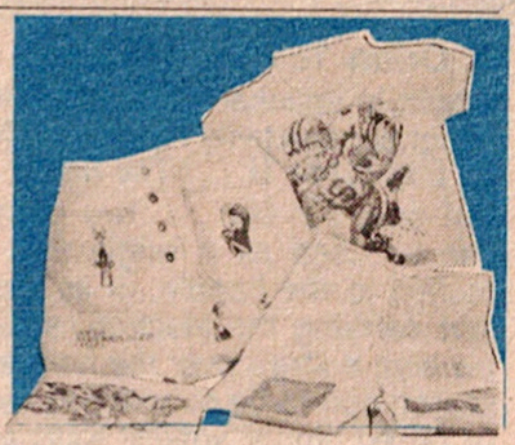
Dye Pack Assortment. Eight 1/6 oz. bottles: pink, red, blue, yellow, green, purple, orange, and pearl. Colors mix to produce others. **No. 40,999 $2.70 Ppd.**

Spacial-Art Kit

Offers a variety of paper modules to be used for the design and construction of an unlimited number of 3-D shapes. Creative learning by the formation of 3-D forms from two basic 2-D shapes . . . Quads and Deltas. Kit consists of ten 12½" sq. sturdy white paper sheets on which 140 separate rings (3", 4¾", and 7¼") have been perforated and scored for folding. It's so simple, Kindergarten kids always succeed . . . yet challenging enough for artists. Add color via paints, paper, glue-on sparkles, etc. . . . add texture via doilies or lace over openings. Make lamp shades, Japanese lanterns, masks, etc. Instr. incl. **No. 71,337 $3.95 Ppd.**

Spacial Art Kit #2. Explore a wider range of modules. ⅓ larger than above kit. **No. 71,719 $4.50 Ppd.**

Amazing Magic Transfer Kit



Custom design T-shirts, jeans, sweatshirts!
Takes only 10 min.!

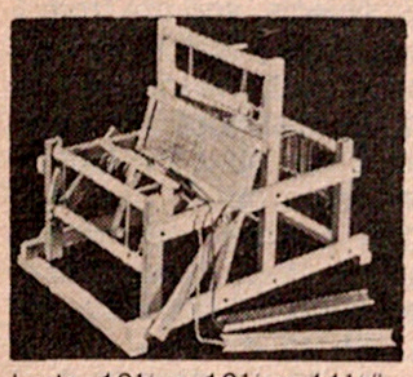
Transfer the latest news photos, ads, or eye-catching pictures from the magazines you read to the clothes you wear. It's easy . . . the whole process takes only 10 min.! Custom design T-shirts & sweatshirts for your friends! Get best results with color or b&w pictures from slick magazines like Time, Post, etc. Pictures on such paper transfer to almost any material (best on cotton). Once transferred picture is washable and permanent (don't dry clean). 2 oz. bottle of transfer solution; (3) 8 x 10" sheets of transfer paper; squeege; sponge; and instr. incl. **No. 71,597 $3.95 Ppd.**

Refill solution. 8 oz. **No. 41,718 $2.25 Ppd.**

Refill paper. (3) 8 x 10" **No. 60,925 $1.20 Ppd.**

Silk Screen Printing Kit

Print on paper, glass, fabric, wood, etc. At home, school, or industry . . . so many uses. Decorate T-shirts, ties, posters, nature prints, banners, greeting cards, signs, etc. In silk screening (serigraphy), ink is pushed across a stencil-bearing silk screen, penetrates the silk in selected areas, and is deposited on the surface. Great for kids! Simple soap and water cleanup—all non-toxic, non-flammable pigments. The kit even lets you reproduce fine line drawings and detailed photographs from a positive. Great for teachers and class projects. Incl. 10 x 14" screen (base/frame); 5 colors of ink; brush, spreader; prepared art; photo emulsion; filler; sensitizer; easy instr. bklt. **No. 71,873 $21.95 Ppd.**



Beginner's Loom, $13.75

So inexpensive . . . anyone can learn to weave! 2 filled shuttles & asst. color yarn for ties, scarves, doilies, etc., up to 8" wide. Portable. Comb automatically controlled by single lever. Completely assembled with weaving started. Instr. 13½ x 10½ x 11½". **No. 71,420 $13.75 Ppd.**

Loom w/16" Weaving Space: Hardwood frame w/plastic comb; 2 shuttles; etc. Instr. **No. 71,667 $31.75 Ppd.**

Deluxe 4-Harness Loom w/20" Weaving Space: Our finest; 24 x 20 x 19"; incl. 600 heddles; manual of instr. **No. 85,205 $160.00 T.C.C.**

"Step-by-Step Weaving," 96pp. **No. 9422 $2.50 Ppd.**

Modeling Plastic Stays Soft Until Baked

Prepare product designs easily. No premature hardening or drying out. White, "plastic" material stays soft indefinitely. Smooth, non sticky, and self-structuring. Does not stain or stick to skin. Baked at 325°F (use kitchen oven) for 15-30 minutes (no kiln or plaster molds necessary), plastic acquires a permanent, non-brittle hardness. No curing. Can be sanded, carved, and drilled. Harmless, non-toxic—easy to color with water-base acrylics. Instr.

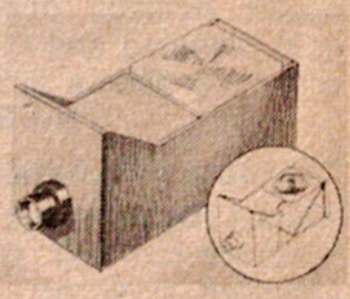
2 lb. Pkg. **No. 60,794 $3.95 Ppd.**

8 lb. Pkg. **No. 71,205 $11.50 Ppd.**

"Optical Drawing Devices"

A useful practical book for amateurs and commercial artists. Learn how to build your own drawing camera, drawing projector, and camera lucida. Tips on their use including purely photographic methods such as direct positives on paper. 16-pg., paperback, 8½x11". **No. 9059 50¢ Ppd.**

Trace Landscapes And Portraits From Life



Make a Camera Obscura aim its lens at the scene you wish to draw; it appears in colorful detail on 11-7/8" sq. screen. Then trace a proportionately-correct reversed picture. Kit contains 3-3/8" dia., 22½" F.L., pcx lens; tube; focusing sleeve; plastic Fresnel screen. You need wood or cardboard and a mirror to complete. Instr. **No. 70,881 $9.00 Ppd.**

GLASS WORKING—BOTTLE CUTTING

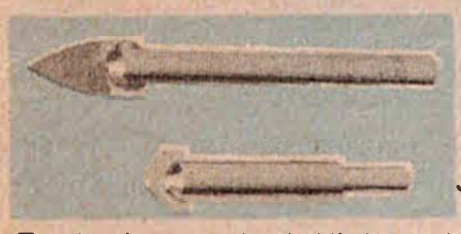
Bottle cutting has blossomed into one of the fastest growing hobbies around. Why not join in . . . it's not only ecological, but also economical. Here's a collection of glass working tools to begin your hobby.

Bottle Cutting and Decorating Kit

The first bottle cutter that enables you to cut in the neck of the bottle! Produce your own sets of glasses and goblets, vases, candle holders, hurricane lamps, and many other objects of beauty and value. Safe, easy to use bottle cutter (5 x 9 x 4¾" high) adjusts to various sizes and shapes. Tube of liquid metal channeling and transparent stain to create tiffany glass effects; lapping plate and abrasive grits; wet/dry polishing paper; candle; brushes; and illus. instr. incl. A rewarding creative challenge! **No. 71,683 $13.35 Ppd.**

Things To Make

1. Glasses or Vases of various heights.
2. Bowls, Butter, Nut and Cheese Dip Dishes.
3. Fish Bowls or Terrariums from ½ gal. bottles.
4. Candle Holders from the top half of bottles.
5. Even Light Fixtures or a contemporary Hour Glass.



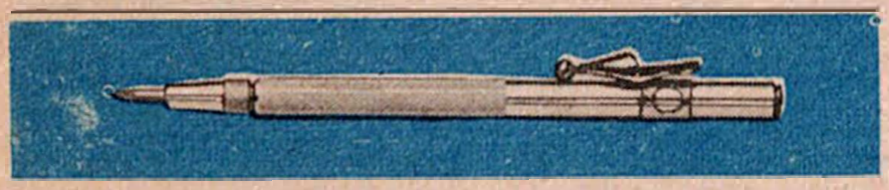
Tungsten Carbide Drills For Glass

Quickly & efficiently drill holes in glass bottles, jars, mirrors, even glazed tile. Each size marked. Nickelled shanks, ½" dia. or smaller, except ½" spear point has 5/16' shank. Instr.

Spear-point tips for drill press use:

1/8"	**No. 41,517**	**$2.50 Ppd.**	5/16"	**No. 41,520**	**$3.75 Ppd.**
3/16"	**No. 41,518**	**2.50 Ppd.**	3/8"	**No. 41,521**	**5.95 Ppd.**
1/4"	**No. 41,519**	**2.95 Ppd.**	1/2"	**No. 41,522**	**6.25 Ppd.**

½" General-purpose tip for use in electric drills, but can be used in drill press **No. 41,516 $2.75 Ppd.**

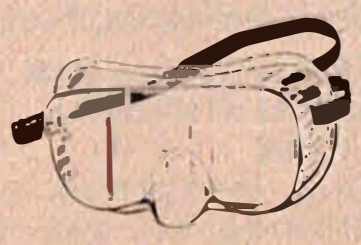


Carbide Scriber Perfect for engraving on metal, glass, gems, and plastics. 5½" long. Also used as glass cutter. With pocket clip. Magnetized top for retrieving small parts. Replaceable tip can be reversed to prevent damage when in pocket.

No. 40,594 $2.25 Ppd.

Replacement Tip **No. 40,595 $1.00 Ppd.**

Protect Your Eyes



Be safe from flying glass chips! Wear these non-flammable, impact-resistant safety goggles with or without glasses. Adjustable headband

No. 70,596 $1.50 Ppd.

Books On Glass Working

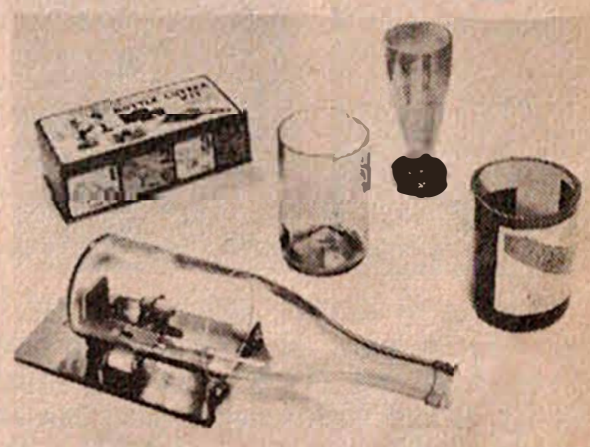
"Creative Glass Blowing." 196 pp. 150 illus. 8 x 9". hardbound **No. 9390 $8.95 Ppd.**

"Kiln-Fired Glass." Learn new ways to decorate and design on glass. 7½ x 10½". 185 pp. hardback. illus.

No. 9413 $12.95 Ppd.

Crystallizing Paint for Beautiful Effects ..... pg. 114
Glass Rods and Tubing ..... pg. 54
Transparent Paint ..... pg. 114
Abrasives, Full Assortment ..... pg. 37
Plastic Color Filters for Designs & Shading ..... pg. 122

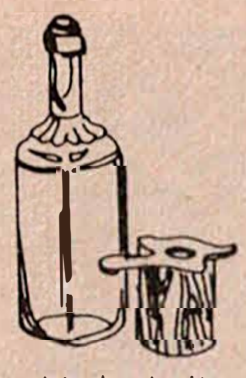
Be Ecological, Be Economical . . . Bottle Cutter Turns Trash Into Treasures!



Make glasses, lamps, candy dishes, candle holders, vases, etc., from empty bottles. Cut any round bottle safely and easily in less than 5 minutes with just the cutter, candle, and an ice cube! Turn any jar or bottle (2-1/8—6½" dia.) with a smooth surface from waste into handsome glassware. Experimentation and a little practice are the key to becoming a good bottle cutter. Items you make can be sold for profit, used at home, or given as gifts. We've looked over all the bottle cutters on the market, this one outshines them all. Kit includes: 3¾ x 7¼ x 2¼" high cutter (superior horizontal use type); candle; smoothing cloth; 2 oz grinding powder; and instr.

No. 71,475 $10.95 Ppd.

Just Arrived! New Bottle Cutting Accessory



Bottle Boss—Cuts All Types
• Bulged • Small Neck
• Square • Triangular

Up to now, most bottle craftsmen were limited to cutting straight bottles on the standard cutting machine. Not anymore! The Bottle Boss cuts all types of bottles, of any size or shape. Fits our No. 71,475 (above) or use separately for hand cutting. Cutter blade, bolts, wing-nuts, & instr. Wt. 3 oz.

No. 60,986 $4.25 Ppd.

Silicon Carbide Grinding Powders. For best and fastest results start with #80 (coarse) before using #320.

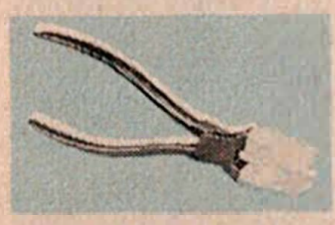
Coarse #80 8 oz. **No. 41,551 $1.50 Ppd.**
Fine #320 8 oz. **No. 41,552 $1.95 Ppd.**

Sanding Accessory Set for electric drill. Finish off surfaces quickly & easily. 5' rubber pad; (6) 5" sanding discs (coarse, med., fine); wet & dry emery paper (4 x 5¼"; 10 grits); instr. **No. 41,722 $2.15 Ppd.**

Tips on Picking A Bottle

1. "No Deposit-No Return" bottles: readily available; best for practice: easy to cut and finish; make useful glasses or decorations.
2. Wine bottles: more attractive; better quality glass (thicker, less likely to break if dropped. Note: "The better the wine, the better the bottle.
3. Champagne-type bottles: not only are the most seams more even as in most wine bottles, but the punts are deeper adding to the appearance.

Glass Pliers . . . for breaking glass on a he!



Reach in up to about 1½" from edge. Twist of wrist makes a clean break on line. Lacquered handles. About 8' long. Jaws: 1-1/8' with tips. For use on glass up to ½" thick. **No. 41,677 $7.75 ppd.**

Transparent Epoxy Cement

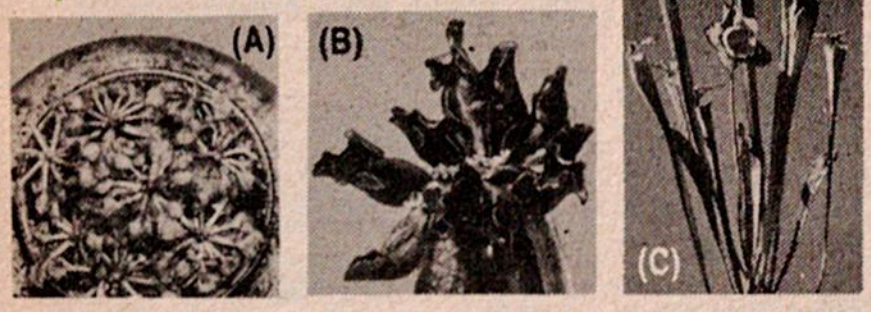
For glass, jewelry, gems, pottery, etc.

No. 40,674 Set; two ¾ oz. tubes **98¢ ppd.**
No. 60,372 Set; two 4 oz. cans **$4.40 ppd.**

GARDENING . . . PLANT SCIENCE

Unusual Plants

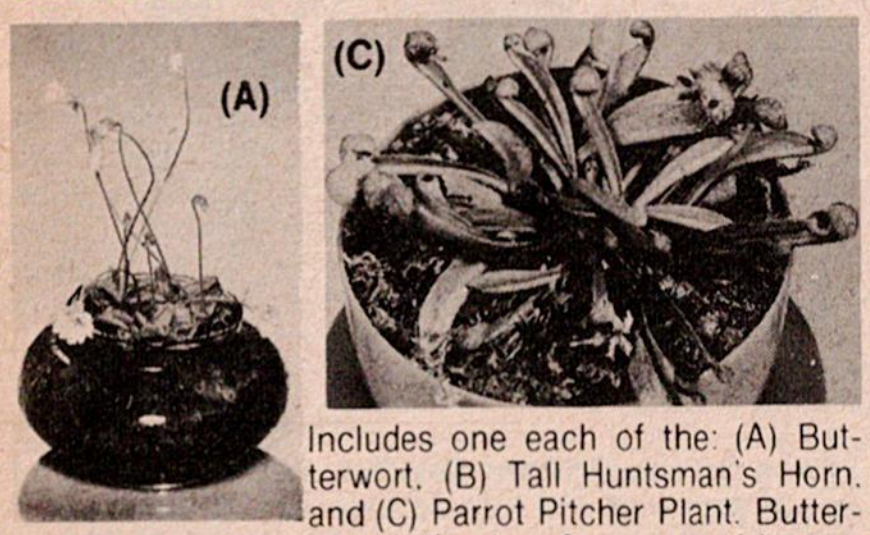
Hungry Carnivorous Plants Capture Their Own Meals



They actually attract, catch, and eat insects to obtain their nourishment. This fascinating assortment includes one each of the (A) Sundew, (B) Purple Pitcher Plant, and (C) Small Huntsman Horn. The red Sundew traps insects by the lure of a glistening, aromatic, glue-like substance on its tendrils. The Pitcher Plant attracts victims by its bright color and sweet secretions in water held in pitcher-shaped base. A lining of sharp spines and downward pointing hair prevents the insect's escape. The Huntsman's Horn is a hollow tube tapering to a very narrow base. Its reddish color attracts insects that are trapped as they explore the tube's recesses. Each plant is root stock, ready for planting, complete with planting mixture and culture directions.

No. 60,922 $4.50 Ppd.

Carnivorous Plant Assortment #2



Includes one each of the: (A) Butterwort, (B) Tall Huntsman's Horn, and (C) Parrot Pitcher Plant. Butterworts feature a sticky, hair-lined surface on oval leaves. Only about the size of a half-dollar but powerful enough to catch and hold gnats, mosquitoes and even flies. They bear lovely yellow flowers each spring. The Tall Huntsman's Horn has hollow tubes that grow to 14 or more inches tall. Insects are attracted by the sweet substance secreted by glands of the plants and their yellow hoods. Insects eventually drown in the water collected in the hollow tubes. The numerous small pitchers (6" long or less) of the Parrot Pitcher Plant are curved, partly-reclining, with a hooded opening. Insects are attracted in the same manner as with the Huntsman's Horn. Each plant is root stock, ready for planting, complete with planting mixture and culture directions.

No. 60,976 $4.50 Ppd.

Colorful Carnivorous Cobra Lily IS DEADLY TO INSECTS

Amazing Cobra Lily actually looks like the deadly cobra. Its reddish-colored forked tongue is covered with honey glands that attract all types of insects. Once inside the green hood, downward pointing hairs prevent the insect from crawling out. The insect eventually falls into the base of the plant where the digestive fluids are located. Grows indoors or out (resistant to frost). The long shoots of the Lily are removed before shipping; once planted they grow within a few weeks. Instr. incl.

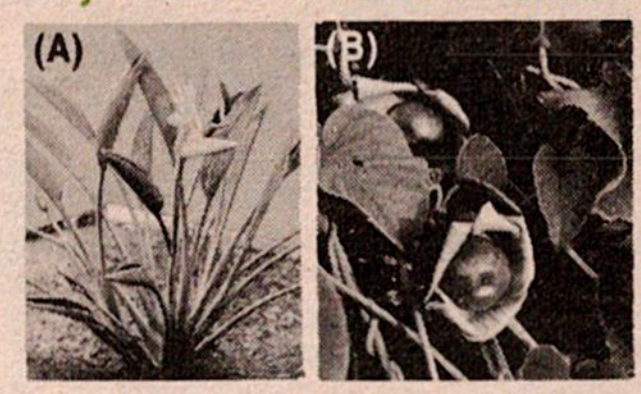
No. 60,972 $2.75 Ppd. 2 or more @ $2.50 ea. Ppd.

Poor Butterfly . . .

The carnivorous Venus Fly Trap (Dionaea muscipula) is one of the world's most unusual and amazing plants . . . it lures, catches, and eats live insects! The trigger-activated traps snap shut in 1/20 of a second to capture an unwary fly or moth that touches the tiny "trigger hairs" in the lobes of the trap. The insects are digested in a few days (also eats meat, mosquitoes, and other small insects). If the trap is teased to snap with a pencil or finger, it will shut, but reopen within 24 hours when it finds no food inside. Easily grown at home in about 8 weeks, the Traps are fascinating and educational for everyone. 3 large Venus Fly Trap bulbs with growing instructions.

No. 60,859 $2.00 Ppd.

May The Bird Of Paradise Grow In Your Home



Make your home a Hawaiian paradise with this assortment of exotic plants. 5 pkg. of seeds or log roots, 1 each of: (A) Bird of Paradise (seeds). Blooms profusely in brilliant reds, yellows, blues, and oranges. Grows indoors or out. This exotic flower lives for years increasing in size and beauty. (B) Hawaiian Wood Rose (seeds). 100's of blossoms burst from its vines each year. When blossoms dry, they turn a rich golden brown, wood-like in texture. Can be made into everlasting floral arrangements. (C) Hawaiian Palm (seeds). Brings the beauty and greenness of outdoor Hawaii indoors. (D) Aloha Green Ti Plant and (E) Hawaiian Fire Ti Plant (both log roots) are both hardy and make colorful floral decorations. Growing instr. incl. for each

No. 60,929 $5.35 Ppd.

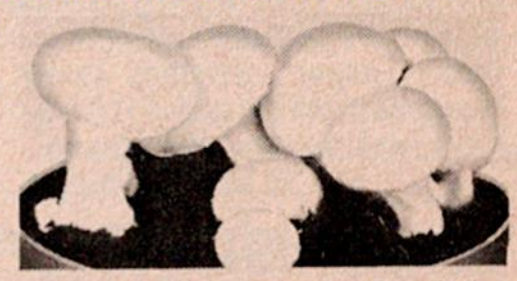
A Plant That's Ticklish?

The exotic Mimosa is! Sensitive to touch, its leaves curl & droop when tickled. Repeat many times without harm. Leaves fold up at night. Green fern-like leaves; small lavender flowers; grows about 12" high. Seeds, 7" grow-dome, growing mixture/fertilizer.

No. 60,921 $1.25 Ppd.

Grow Delicious, Fresh Mushrooms At Home

- **Add zest to any meal**
- **Makes an unusual hobby**



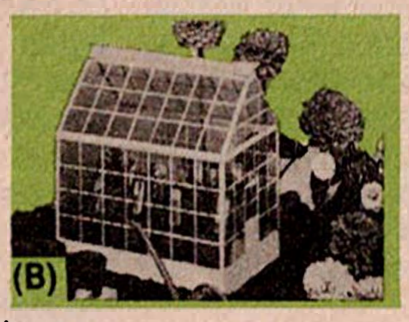
This Mushroom Growing Kit has everything you need. Scientifically processed spawn are pre-planted in compost with all the necessary ingredients. You just add water on a regular basis. Follow the easy instructions and a full crop is ready in approximately 30 days and continues to grow in "flushes" for 4 to 5 weeks. It won't be shipped during hot weather from about April 1 to October 1. Orders are accepted year-round and shipped when weather permits directly from the source to assure a fresh supply.

Mushroom Garden **No. 71,898 $4.95 Ppd.**
Mushr. Farm (4X bigger) **No. 71,899 $7.95 Ppd.**

TAKE A VENUS FLY TRAP HOME FOR LUNCH

Indoor Growing

Miniature Greenhouse Gardens



• An exciting "growing" hobby

Ideal for plant hobbyists, teachers, students, and shut-ins. Grow orchids, ferns, African violets, etc.

(A) Big 28" Greenhouse. A fine giant among the miniatures! Its environment and unusual plant feeding and watering system makes anyone a green thumb gardener. Includes everything you need: large decorative planter; water storage base; 3 seed starter units; several rare seed varieties; plant food; soil mix; thermometer; markers; table pad; and instr. Overall size: 28 x 20 x 16" high. **No. 80,173 $51.00 Ppd.**

(B) Mini Greenhouse for both indoor and outdoor use. Ideal for raising house plants, trees from seed, ferns from spores, and in rooting cuttings. Enough plants can be grown each season to adorn the average residential property. Just plant & add water. Includes: trowel; 12 pots; balanced soil mix; 5 pkg. of seeds; 12 plastic labels; thermometer; no-spill bottom tray; watering can; instr. Size: 9 x 11¼ x 11¾". **No. 71,270 $8.60 Ppd.**

Terrarium Kit . . . to start an indoor mini garden

Decorate your home & see how the plants you choose thrive in a protected environment! Provide youngsters with many fascinating hours of nature study. Perfect for city apartments. A simple combination of a clear container, soil, rocks, charcoal, air, water & plants make terrariums an easy and beautiful way to grow and display plants almost anywhere! Kit includes: 10" clear plastic sphere (base & cover); special soil mix; charcoal; filter rocks; and 19-page "Terrariums" booklet (with plant ideas & sources). You supply the plants. **No. 71,612 $11.25 Ppd.**
Kit with 12" Terrarium **No. 80,198 $12.95 Ppd.**

100% Acrylic Domes . . .

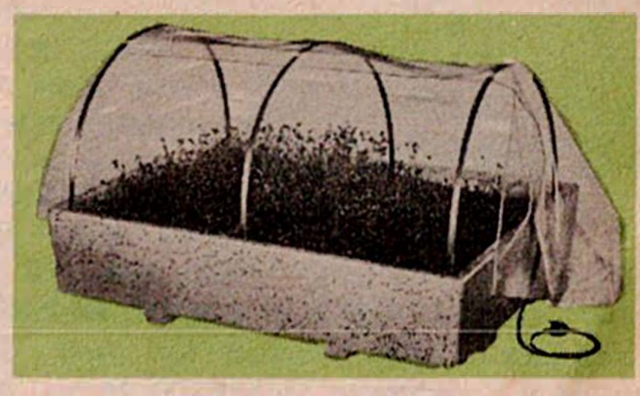
For Terrariums that won't discolor, craze or crack with age! High quality domes that are ideal for planting your miniature garden in. Also useful for biology projects: animal, fish & insect behavior studies; fertilizer, nutrient or other soil investigations; ecology & environment research; etc. Half the weight of glass, these 1/8" thk. acrylic terrariums are much more resistant to breakage than glass or styrene. Flattened bottoms for stability on table or shelf.

Dia.	Air Hole	Approx. Ht.	Stock No.	Price
7"	1¾"	6-1/16"	71,708	$ 4.00 Ppd.
12"	2½"	8-3/16"	80,178	$ 8.50 Ppd.
18"	2½"	13-13/16"	85,215	$17.50 T.C.C.

Terrarium Vent for 2½" air holes. Regulates air flow and humidity. **No. 41,796 $1.50 Ppd.**

"Terrariums & Miniature Gardens". Step-by-step guide to choosing the container & plants, planting the garden, etc. Bottle, underwater cacti, bonsai gardens, etc. Illus.: 8¼ x 10¾"; 80 pp; pprbk. **No. 9457 $1.95 Ppd.**

Electric Thermostat Greenhouse . . .



3-sq. ft. of growing area! Constant 70° temp. speeds germination and helps produce healthy, thriving plants . . . ready for outdoor planting. Thermostat maintains temp., and allows cable to heat only when more heat is needed . . . saving electricity and protecting the plants. All connections are waterproof. Planting box (1½ lb.) molded of lightweight, expanded polystyrene ¾" thick (29 x 15 x 4" high) holds ½ bushel of growing medium. Also incl.: 12-ft. thermostat heating cable: 3 supports; 3-ft. cord and plug (works in any 110/120v AC outlet); and instr.
No. 80,153 $14.95 Ppd.

Gardening In A Bottle . . . The Most Unusual Terrarium Kit

A bottle terrarium is probably the hardest of all terrariums to plant, but on its completion, even "you" will be amazed at your achievement and the compliments you'll get. All you need is gravel, soil, plants & some simple tools. This Bottle Terrarium Kit includes a 3-gallon clear, heavy-gauge, glass bottle; 2 pair of giant wooden tongs (approx. 24" long) for planting and maintenance of terrariums in all types of jugs; and "Terrariums & Miniature Gardens". This 80-page illustrated paperback shows how to construct bottle, wild plant, and cacti terrariums, and gives care and maintenance instructions. **No. 80,195 $14.95 Ppd.**
3-Gal. Bottle only. No. 80,197 $ 9.95 Ppd.

The Terra-Zoid® Terrarium Kit

Fascinating for classroom studies . . . attractive for home decor. The Terra-Zoid is unusual because it clearly shows the different layers of soil necessary for a healthy terrarium . . . and the slanting sides allow you to actually view some of the roots as your plants grow. 8 x 9 x 12" Terra-Zoid, humidity control vent, special soil, filter rocks, charcoal, decorative accessories & complete instr. You supply the plants. **No. 71,870 $15.50 Ppd.**

Complete Miniature Terrarium Growing Kit

• Plants • Terrarium • Soil • Charcoal • Decorations

A fascinating kit for youngsters & oldsters . . . with a garden that lives in its own little world. Clear plastic enclosure protects plants & enables you to observe & work with them under perfectly controlled conditions. Kit has everything you need: 4 plants (Dracaena sanderinii, Andisia, Podocarpus, Crassula): 2-pc. terrarium; soil; charcoal; natural decorations (shells, wood, etc.); & instr. (D/S. No C.O.D.'s)
No. 19,181* $10.95
*No shipment to Alas., Ariz., Calif. or Hi.

Lamps That Bring Sunlight Indoors

These full spectrum tubes give true color fidelity . . . colors appear more alive & vibrant (just as they would under natural sunlight). Both have a color rendering index of 91 (natural outdoor light is 100) . . . closer to natural light than regular fluorescent tubes. They promote quick germination, healthy seedlings, good rootings, long plant life, etc. Also give natural light in offices to improve efficiency, schools & libraries to reduce eyestrain & more. Fit standard fluorescent fixtures. **Each is a pkg. of 4 tubes. All Ppd.**

Vita-Lite® Tubes. Perfect for cacti, orchids, bromelaids (pineapple family), indoor flowering bulbs, annuals, roses . . . any plants requiring a controlled amount of ultraviolet light. Kelvin temp.: 5500°. Mfr. guarantee for 2 full years.

Natur-Escent Tubes. Ideal for balloon-type plants, begonias, Cinerea, ferns, African violets and most foliage plants. Also good for aquariums. Kelvin temp.: 5000°. Long tube life . . . 20,000 hr.

18w, 18" long.	**No. P-71,832**	**$21.75**	**15w, 18" long.**	**No. P-71,151**	**$15.75**
20w, 24" long.	**No. P-71,818**	**$21.75**	**20w, 24" long.**	**No. P-71,152**	**$15.75**
40w, 48" long.	**No. P-80,192**	**$22.75**	**40w, 48" long.**	**No. P-80,124**	**$15.75**

Indoor Growing Lamps

Incandescent lights give correct color for growing. Sealed-in reflector stays brighter. Screw-in base; use porcelain socket; 2500-hr. life; instr. incl.

75 Watt No. 71,641 $5.75 Ppd.
150 Watt No. 71,642 $5.75 Ppd.

"The Indoor Light Gardening Book"

By G. A. Elbert. Comprehensive "how-to" guide to the wide variety of flowers that grow well under artificial light. How to grow and propagate them, etc. Illus. 250pp. 7 x 10"; hrdbk.

No. 9448 $10.95 Ppd.

Bonsai Gardening

Miniature trees, forests, a whole landscape . . . right at your fingertips. The ancient Oriental art of Bonsai is an exciting & rewarding hobby that requires little room and is a constant source of pride. And your bonsai doesn't have to be old to be enjoyed . . . because it's not the actual age, but the "apparent" age that's important. With a little experimenting you can make a 2-yr. old pine (1-ft. tall) from a nursery look like a windswept 50-yr. old pine! In this section, we offer an excellent book, quality tools, seeds if you want to start from scratch, and the brand new Edmund Bonsai Kit.

"Bonsai". An excellent "how to" book on the culture and care of miniature trees. Selecting a suitable plant, training & caring for it; layering; dividing; grafting; potting; fertilizing; and tools required. Seasonal care charts. Illus.: 8¼ x 10¾"; 80pp paperback. **No. 9444 $1.95 Ppd.**

ANNOUNCING . . . The Edmund Bonsai Kit

- **Starts you off on the right foot**
- **All necessary tools • Authentic bonsai pots**

The complete Edmund kit

A typical Bonsai

A kit designed for anyone interested in jumping into the exciting world of bonsai. Miniature trees, forests . . . an escape from the rush of everyday life. Everything you need is included, except the plants and the soil (a specimen sent through the mail wouldn't be the quality or size so easily obtainable from your local nursery). The most nondescript nursery plant can easily be transformed into an attractive bonsai by pruning and potting. The excellent paperback, "Bonsai: Culture and Care of Miniature Trees" (80pp.) is included in this fine kit . . . it's the best step-by-step guide to bonsai we've seen! Complete Kit also includes: 2 terra cotta pots; shears for trimming & shaping plants; 85-ft. of 22 gauge wire & 16-ft. of 14 gauge wire for training trees; 2 chop sticks for use in planting trees; wire bottom screen; mist sprayer; and book. If you are interested in Bonsai, we highly recommend this kit. **No. 71,869 $16.95 Ppd.**

Bonsai Trimming Shears

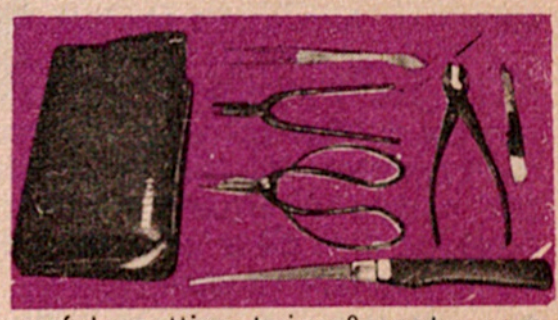
For cutting & arranging flowers as well as snipping thin twigs. Asset to Bonsai experimenters & cultivators. 5½" long (2¼" blades). Imported from Japan. **No. 60,930 $2.25 Ppd.**

Dwarf Tree Kit . . .

Complete kit for growing miniature trees from scratch!

If you have lots of patience, but get real enjoyment from seeing a plant develop from next to nothing . . . this is the kit for you! Comes with 9 types of dwarf tree seeds: Asiatic Cypress, Temples Fan Palm, Oriental Juniper, Siberian Elm, Chinese Evergreen, Fruit Bearing Apple, Canary Island Date Palm, Far Eastern Pear & Jungle Pepper. After a year's growth you can begin training them as miniature trees. Kit also includes: soil mixture; specially-compounded plant-food tablets; identification markers; tree pots; & instr. **No. 71,017 $3.98 Ppd.**
Note: If you intend to treat the Dwarf Trees as Bonsai, we recommend our "Bonsai" book for complete details.

Imported 6-Pc. Bonsai Tool Kit



High quality tools: 7" shears for trimming plants; 12" saw for cutting thick roots; 8" angular twig nipper for safely cutting twigs & roots; combination pinset/tamp for removing weeds & packing; 6" knife; 7" nipper for crimping wire. Specially designed for Bonsai plant cultivation by Japanese craftsmen. Leather case. **No. 71,753 $33.00 Ppd.**

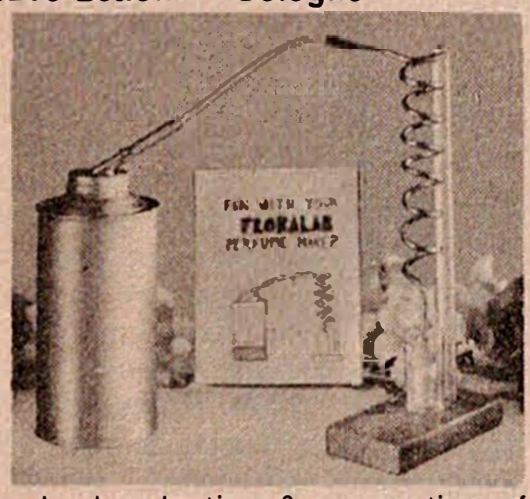
Sprayer Keeps Flowers Fresh

Plants thrive indoors with regular spraying (especially in heat dried rooms in winter). Brass; 3½ x 5½"; plunger. **No. 41,743 $3.25 Ppd.**

Botany Crafts

Your Own Working Miniature Still
Turn Favorite Flowers Into Fragrant Perfumes

• Perfume • After Shave Lotion • Cologne



A standard distillation condenser to make small quantities of liquids. Capture favorite garden fragrances — roses, honeysuckle, gardenias, pine, mint, lime, cinnamon, Eucalyptus, etc.—and make your own perfume inexpensively. Distilling process is the "key"! Only 5 steps involved: selection & preparation of raw material (flowers, berries, roots, etc.), enfleurage (trapping essential oils in lard), distillation (solvent extraction of essential oils & subsequent condensation), and capturing essential oils in usable form. Instr. booklet shows how to make perfume into Cologne, aftershave & hand lotion, and perfumed soap. Complete mini distillation equipment incl. (about 11" high), you supply raw material, lard, & undenatured ethyl alcohol. Easy, creative, & fun! **No. 71,684 $10.75 Ppd.**

"The Practical Book Of Organic Gardening"

By Allan A. Swenson. A comprehensive step-by-step guide to producing nature's purest foods at home in a window box or small garden. Features chapters on mulch, compost, soil testing, landscaping, etc. Illus.; 4¼ x 6-7/8"; 236 pp; pprbk. **No. 9446 $1.25 Ppd.**

Turn A Petunia Into Porcelain Or Make A Durable Daisy . . .

Flowers That Last Forever!
An amazing new kit for preserving fresh flowers as porcelain-like beauties. Great for garden flowers, corsages, and wedding bouquets! Easy-to-do: remove stem; insert floral wire; brush warmed Ceramex® over petals; let dry; coat with glaze for glossy finish; and cover wire with floral tape. Instr. also tell how to porcelainize pipe cleaner flowers, match boxes, baby shoes, & fancy bottles. Kit Incl.: 5 colors of Ceramex® (white, green, blue, red, yellow); clear glaze; floral tape & wire; & brush. **No. 71,752 $7.00 Ppd.**

Flower Drying Art Kit

Now anyone can create professional dried flower arrangements. Daisies, forget-me-nots, jonquils and snapdragons make beautiful bouquets of dried flowers. It's easy with new "thirsty" silica gel crystals, that absorb up to 40 times their own weight in water, are safe, and may be used over and over. Many flowers dry in only 4 to 7 days after arranging them in can of silica gel. Once dry, you insert floral wire, apply floral tape, and arrange them in your favorite vase. Silica gel, drying can, floral tape & wire, & complete instr. incl. **No. 71,812 $6.95 Ppd.**

Experimental Growing and Gardening Aids

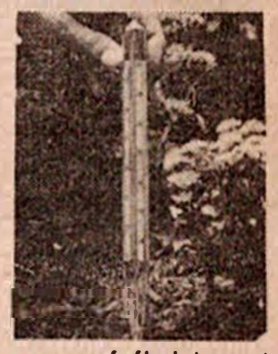
Is Your Soil Sweet or Sour?

Soil Test Tape answers the question . . . Scientifically accurate method of testing the pH condition of your soil. Simply pull out tape, press firmly against moist soil for 30 sec., and check it against pH 4-9 chart. Raise or lower pH to best level. 16-ft. roll.
No. 41,471 $2.40 Ppd.

Your Plants Dying of Thirst?

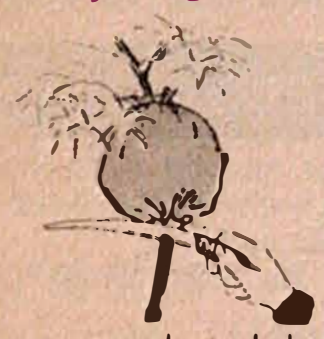
Scientific tool electronically measures soil moisture indoors and out. Insert tip to plant's root depth; moisture level instantly indicated on easy-to-read meter. Pointer moves from dry to wet. Weatherproof, completely electronic, self-contained, no external power needed! 14" long. No more worrying about watering!
No. 80,159 $7.95 Ppd.

Inexpensive Soil Thermometer



A reliable mercury-filled thermometer that measures temperatures from 0 to 130° F. Soil range (45-75° F.) indicated in yellow. Glass sealed with closed loop for hanging. Also for checking temps of fluid and air. 1° divisions; numbered every 10°. 5/8" dia. x 8-11/16" long
No. 60,953 $3.00 Ppd.

Airlayering Kit . . . Grows Plants in WEEKS Instead of Years!



Oriental method of propagating trees, vines & shrubs. Simply select branch, slit slightly, apply rooting compound, pack ball of damp moss around it & cover with an airtight plastic sheet tied on both ends. Plant develops roots in the air! When roots reach max. development in 3 to 8 weeks, snip off branch . . . a new plant is born, rooted & ready-to-grow anywhere! Saves years of growing & maintains all characteristics of parent plant. Ideal for many slow growing woody plants (birch, grape vines, spruce, boxwood, roses, etc.). Material for 10 or more airlayerings. Instr. **No. 71,661 $3.25 Ppd.**

Fertilizer Assortment . . .

for gardens, labs, science projects
Prescription fertilize with the 3 elements most generally required in plant nutrition. Clean to handle, readily mixed, 100% water soluble. Food value is carried in solution directly to roots & is immediately available for absorption by plants. Nitrogen for lush stalks, flower leaves, vegetables, etc. Phosphorus hastens root development, blooming, etc. Potash benefits crops that mature underground & increases disease-resistance. 1-gal. solution covers about 50 sq. ft. at less than 4¢ per gal. 1 lb. each of 44% N, P_2O_5, and K_2O. Instr. incl. Great for experimenting! **No. 71,571 $5.50 Ppd.**

Mess-Free Compost Maker

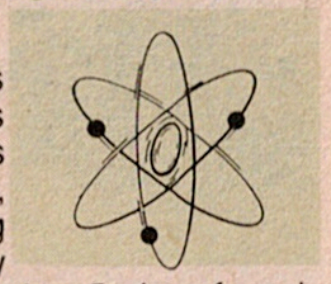
Fool-Proof, Home Recycling System
Now, in 8 to 12 weeks instead of long months, you can rapidly shrink huge quantities of waste vegetation into rich organic compost—quickly convert/recycle leaves, grass clippings and other garden debris into rich sweet-smelling humus—eliminate burning or hauling. Each compost maker tablet contains billions of micro-organisms specific for natural decomposition. Mix with water. Non-toxic, contains no chemicals; ecologically approved method—eliminates composting odors. 48 tablets & instr. **No. P-60,931 $4.75 Ppd.**

Discover The World Of Botany With . . . Edmund's Experimental Growing Kit

Explore the wonders of plant growth! You can, with this exciting selection of hard-to-find materials: 20gm. N.A.A.—lanolin paste regulator to mimic natural hormones, cause curvatures, etc.; diluter-control (20 gm.); .1% gibberellin concentrate (1½ oz.) to grow giant oddities; irradiated marigold seeds; black plastic mulch (4 x 4-ft. sheet); (3) 4 x 5" color filters for light experiments; 3 measuring cups; eyedropper; chromatography paper (½" x 3-ft.); 12 pots; 2¾ oz. soil; and tray. 250pp illus. handbook gives over 80 experiments. **No. 71,412 $6.95 Ppd.**

Grow Super Squash And Mighty Marigolds

Experiment with Atomic Seeds



Study amazing growths. Seeds irradiated with different amounts of Cobalt-60 may produce plants with rapid growth, early maturity, superior survival, astonishing mutations. Seeds are completely safe and not radioactive. Each kit has 5 pkg. of seeds: 50,000; 150,000; 500,000; 4,000,000 rads, a control (non-irradiated) and instructions so you can experiment with different concentrations for Science Fair projects. Give someone a Super Squash this year.

Squash about 300 seeds **No. 41,688 $2.00 Ppd.**
Marigold about 500 seeds **No. 41,687 $2.00 Ppd.**

"Funny Seeds" To Grow And Amaze Your Friends

Giants, Snow White Vegetables, & More

Santa's Magic Seeds. 6 snow-white edible vegetables. Icicle radishes, white beets, snowball tomatoes (sub-acid, ideal for anyone allergic to regular tomatoes), hailstone mini-turnips, "popcorn", and Christmas cucumbers. Minimum 12 seeds ea. Instr.
No. 60,957 $3.50 Ppd.

Texas Super Garden. 6 amusing vegetables: "Balony Cucumbers" that grow 12 to 15" long; "Banana Muskmelon" . . . giant 7 lb. melons shaped like bananas; "6-Shooter Corn" with 6 ears of corn on each stalk; "Tomato Trees" you may need a horse to reach; "Beefsteak Onions," 3 lb. and so sweet you can eat them like apples; "Vine Sponges" on a vine 20-40 ft. long with cucumber-like fruit you can make into fiber sponges. Minimum 12 seeds ea. Instr. **No. 60,960 $3.50 Ppd.**

Giant Corn. Twice the size of ordinary corn seeds, this king-size corn from Peru produces a "Corn Forest" of stalks up to 15 or 20-ft. tall! Win prizes! Make your local papers! Harvest kernels and use them yourself or sell them for next season. Minimum 12 seeds. Instr.
No. 60,959 $1.25 Ppd.

Keep Birds Off Fruit Trees & Plants . . .

With 100% Nylon Anti-Bird Mesh

Big 9 x 21-ft. net gives total crop protection against bird attack from budding time to harvest . . . allows sun, rain, and air to fall freely on crop . . . and won't harm birds or plants. Lightweight; easy to spread over plants; will not rot or mildew; reusable for years. Recommended by many Agricultural Experiment Stations. Great support for trellis-climbing plants. Instr. **No. 71,711 $6.00 Ppd.**

A Cabbage . . . 10-Ft. Tall ? ? ?

Big Broccoli! Crazy Cucumbers! Giant Geraniums!

It can happen, when you experiment with Gibberellin, a natural plant growth regulator. Grow giant oddities from familiar plants, reverse dwarfism, change stem, bloom, and light response! Since each species reacts differently you might even make an original discovery! You'll amaze your neighborhood with a garden of giant flowers. Great for experimenting . . . breaks dormancy, and speeds growth and maturity in plants, seedlings & small trees. .005% Potassium Gibberelate Aerosol (6 oz.); and experiments & instr. (Since Gibberellin is an experimental substance, we do not recommend the consumption of foodstuffs). **No. 61,010 $2.99 Ppd.**

Soil Test Kits

Use these kits as basis of an exhibit or for making tests in any science project involving plants. Contains solutions necessary for numerous tests for nitrogen, phosphorus, and potash. Also incl.: color card for interpreting tests; indicator for testing pH; 4 test tubes; pH preferences of common plants; and instr.

Starter Kit. **No. 60,118 $2.00 Ppd.**
Larger Kit. 45 tests—15pH, and 10 ea. for nitrogen, potassium and phosphorus. **No. 70,406 $7.95 Ppd.**
Deluxe Kit. 90 tests—30 pH, and 20 ea. for nitrogen, potassium and phosphorus. **No. 70,405 $9.95 Ppd.**

Your potted plant can water & feed itself! . . . With The Plant Caretaker®

Grow healthier, longer-lasting plants! The Caretaker "knows" when & how much to water or feed your plants . . . when you go on vacation it waters your plants automatically (up to 2 to 5 weeks). Plants regulate their own water and nutrient intake. 4¾" dia. water-conducting foam pad embedded with 12 month's supply of nutrients absorbs water from 9" dia. reservoir (holds 1⅓ qts.) and allows it to pass into the soil in your pot as needed. Caretaker holds one 100-lb. potted plant or 3 small pots at once. Pad can also be used alone in the pot of your choice. **No. 71,814 $3.49 Ppd.**

JUST ARRIVED . . .

"A Child's Garden." A guide for parents & teachers packed full of growing projects & experiments to fascinate children. Illus.: 8½ x 11"; 45pp; pprbk.
No. 9121 $1.50 Ppd.

Exotic Desert Cactus Assortment

- **Thrives In Homes . . . Apartments**
- **Large Blooming Size**

If you can't grow anything else—you can grow these exotic desert beauties. Everything you need for a perfect cactus garden is included. You get soil, decor pots, and 3 mature Southwest cacti: Horse Crippler, Red Rainbow, and Pin Cushion. All you do is add water—and you only do that once a month. Most bloom brilliantly within 90-120 days. Great for desert terrariums. Instr. incl. **No. 71,824 $3.50 Ppd.**

Can You Tell Your Alpha From Your Theta?

• Hear The Mysterious Waves Within Your Body • Completely Safe

Biofeedback Instruments Let You Monitor The Brain, Heart, And Nervous System.

What is Biofeedback?—The exciting new field based on the use of sensitive electronic instruments allowing us to observe what goes on within our complex bodies.

How do we measure the feedback?—*Many electrochemical activities occur in the body and can be detected by using certain devices. In the brain, many wave forms have been recorded and classified into specific shapes and rhythms. The most common are Alpha waves (found when you are totally relaxed) and Theta waves (occuring most during creative moods).*

(A) The Alpha Theta Wave Sensor—A unique biofeedback sensor that detects brain waves and allows audio and visual monitoring of their signals. This reliable unit offers features and electronic sensitivity comparable to models costing much more. The lightweight, portable metal instrument is completely safe, operating on two 9v transistor batteries. A unique electrode headband allows the user to slip it on and off in seconds, without the use of messy electrode creams ands solutions. Features a special monitoring button to simulate and allow identification of alpha sound, L.E.D. visual feedback and instr. 8 x 3 x 4". Wt. 24 oz. **No. 1635 $128.00 Ppd.**

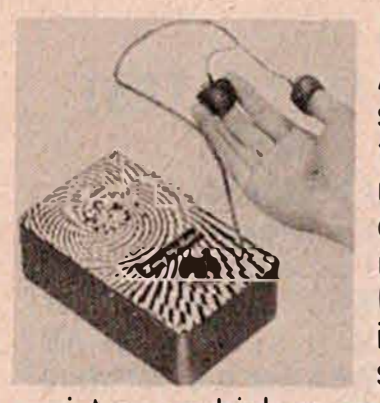
(B) Bio-Feedback Monitor—This lightweight instrument conbines brain wave, heart rate, and skin resistance feedback in one package. Head electrodes hooked to a high gain amplifier, signal an audible beep for each Alpha or Theta wave passed. Wrist and finger contact electrodes pick up heartbeat and skin response. Complete with head, wrist & finger electrodes, threshold control & conducting solution. 6¼ x 3¾ x 2". 2 lb. **No. 71,606 $149.50 Ppd.**

"Biofeedback: Turning on the Power of Your Mind" by Karlins & Andrews. Loaded with info. on biofeedback monitoring. 190pp; pprbk. **No. 9447 $1.25 Ppd.**

EMOTION METER . . . TELLS ALL

Lie Detector Type Device Really Works!

Test your friends, relatives, co-workers, or classmates . . . find out what their hidden likes or dislikes are! The Emotion Meter (a transistorized electronic device) measures changes in body resistance caused by changes in a person's emotional state. It indicates these changes on an easy-to-read 50-microampere meter. The needle movement only indicates an emotional response, not whether it is favorable or unfavorable. Easy to use, this amazing instrument is both sensitive and accurate, but its effectiveness depends upon the questions asked and the interpretation of the meter response by the user. This unusual item is perfect for entertainment and educational purposes. Great for parties, science projects, psychological experiments, and tests on the reactions of plants and animals to various stimuli. Plastic case: 2-7/8 x 4 x 1¾" overall, with: on/off switch; "skin contact" bar; 1½-ft. bar cord; and instructions with suggested uses and games. Includes long-lasting 9v battery. Wt.: 10 oz. It's a fine product that provides plenty of fun and insight. **No. 41,422 $17.75 Ppd.**



Hang Up Meter . . . Audio

A high pitched tone gives your secrets away every time! Similar to scientific "psychogalvanometers" used for years by psychologists to learn about the nervous system. The "Hang Up" Meter audibly measures changes in skin resistance. Changes in stimuli mean changes in skin resistance which cause changes in pitch from the meter. Sensitivity can be adjusted for a wide range of individual differences in skin resistance. 12-pg. booklet contains 10 different psychological experiments incl. word association, lie detector tests, and self awareness and control. Plastic case (2-1/8 x 3¾ x 6¼") with sensitivity control; 2 "finger-contact" pieces; and 2½-ft. cord. **No. 71,738 $36.50 Ppd.**

See new low-cost Alpha Bio-Feedback Monitor Starter Unit on page 7.

"Eye and Brain: The Psychology of Seeing" by R. L. Gregory. Covers perspective, illusions, etc. Illus.: 5 x 7½"; 255pp; paperback. **No. 9405 $2.45 Ppd.**

Seeing Is Believing? . . . "Visual Illusions" by M. Luckiesh. Color illusions, contrast, geometry, etc. Illus.; 5½ x 8½"; 252 pp; paperback. **No. 9374 $1.75 Ppd.**

Behavioral Science Lab From "Psychology Today"

Gain insight into human behavior—how we perceive, learn, forget, think. Study stimulus control, mirror image effects; train insects to respond to certain stimuli, run mazes, etc. Psychologist ingeniously simplified sophisticated apparatus for home use. 18 experiments (plus suggestions for more)! 5¼ x 8¼" manual (30pp); fish tank; insect & human mazes; tachistoscope perception discs & goggles incl. Excellent kit for teachers & students. **No. 71,584 $13.75 Ppd.**

Do You Have Extra Sensory Perception?

ESP Test Kit and instruction booklet employs scientific techniques to test you and your friends' power of ESP. Test for Telepathy (messages sent from one mind to another), Perception, Psychokinesis (movement of objects by mental power), and Precognition (foreseeing the future). For individuals or groups or use as unusual adult party games. 50 color and symbol cards, pads for test; one die; and instr. incl. A good Science Project too!

No. 41,454 $3.00 Ppd.

ECOLOGY

POLLUTION TEST KIT . . . Over 30 Activities

Check Pollution In: Air . . . Water . . . Soil
Learn About: Biodegradables . . . Anti-Litter

Best Ecology starter kit yet! A fascinating, scientific environmental measurement kit for youngsters—ages 8 through young adult. The safe chemicals and apparatus provided permit over 200 hours of pollution testing. Designed to detect and, in many cases, measure degree of pollutants—aldehydes, sulphur dioxide, ozone, carbon monoxide, carbon dioxide—in air, water and soil. Alkalinity and acidity levels also can be measured. Teaches what pollution is, how it can be spotted and measured, suggests possible solutions. Incl: smoke chart, biodegradable paper, test tubes, straws, corks, magnifying glass, funnel, safe chemicals, and informative 48-page illustrated instruction booklet. A great science fair project. **No. 71,548 $9.95 Ppd.**

Environmental Test Kits

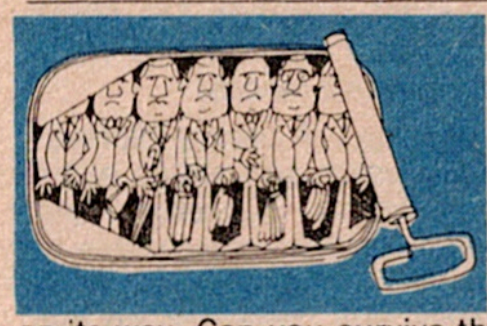
Learn about the environment! Each kit has all the necessary materials (E. G. vials, seeds, applicators, agar, chemicals, eye-dropper, nutrients, algae, brine shrimp, thermometer, pH chart, Instr., etc.)

(A) "Can I Breathe The Air?"—Experiments to single out and identify the air's "spoilers". Test for carbon dioxide, sulfur dioxide, carbon monoxide, particulates, and various oxides. **No. 71,756 $5.50 Ppd.**

(B) "Can I Drink The Water?"—Test drinking water with experiments on nitrates, chemical concentration, and filtration. **No. 71,757 $5.50 Ppd.**

(C) "Life In The Water?" (illus.)—Light penetration in water & its growth effect. **No. 71,354 $5.00 Ppd.**

(D) "What Moves Life?"—Learn relationships of living things to physical factors in their environments; effect of light, water, gravity, temp. **No. 71,356 $5.50 Ppd.**



Population® Game

Unusual game of man and society sends you to planet Celestra to rule a rapidly-developing nation. Your people live by simple farming but an Industrial Revolution is on its way. Can you survive this upheaval, develop your resources fast enough, avoid a dangerous population explosion? Winner does it all! 2-6 players, 12 to adult. **No. 71,640 $7.95 Ppd.**

Water Pollution . . . What Can You Do About It?

Check Water Quality With . . .

WATER TEST KIT

- **Inexpensive**
- **Compact**
- **Easy-to-use**

What's in your water? Is it safe to drink? Who are the polluters? Anyone can perform the scientific tests that answer these questions with the help of the Water Test Kit. Test for: dissolved oxygen, hardness, chlorides, phosphates, hydrogen sulfide. Determine the quality of water samples taken from rivers, lakes, ponds, bays, wells, waste flows, or the tap in your home . . . get a reliable overview of water quality in your community. Kit comes in vinyl case and incl.: 6 vials of pre-measured chemicals (enough for 3 tests each); 3 squeeze bottles of liquid reagents; 2 glass sample bottles; plastic measuring tubes and large sample vial; 2 rubber corks; treated filter paper discs; selzer tablets; color charts; 12-page instr. booklet.
No. 71,472 $12.95 Ppd.

Detergent Test Kit

Interested in how ABS detergents pollute our fresh water streams & rivers? By using this drop-count titration method, you determine the amount of detergent in the water. Set comes in case with glassware, accessories, enough chemicals to carry out 50 tests, and easy-to-follow instr. **No. 60,842 $5.95 Ppd.**

4 Water Pollution & Limnology Booklets

4 illustrated, easy-to-understand booklets by outstanding environmental science authorities: 1) "Our Environment Battles Water Pollution"; 2) "A Study of Water Quality"; 3) "Limnology"; 4) "A Study of Soil Science". 160 pages total. **Set of 4** **No. 9109 $2.25 Ppd.**

6 Water Pollution & Limnology Kits

These 6 handy kits use easy comparative methods for accurate quantitative results. Test fresh water for: dissolved oxygen; carbon dioxide; nitrates and phosphates; silica; pH; and calcium and total hardness. 6 kits come in a rugged, lightweight carrying case. Incl. instr. book, water analysis forms; Limnology book; extra sample bottles. Excellent for schools and health officials.

Complete Set of 6 Kits	**No. 71,358**	**$97.00 Ppd.**
Refill Kit of exhaustibles	**No. 71,359**	**$24.00 Ppd.**

Individual Water Pollution Kits

Each contains the chemicals & other apparatus necessary to carry out testing. Easy-to-follow instr. incl.

pH (100 tests)	**No. 60,838**	**$10.75 Ppd.**
Silica (50 tests)	**No. 60,839**	**$15.75 Ppd.**
Calcium (25 tests)	**No. 60,840**	**$8.50 Ppd.**
Carbon Dioxide (25 tests)	**No. 60,841**	**$6.50 Ppd.**
Phosphate & Nitrate (50 tests)	**No. 71,360**	**$25.75 Ppd.**
Dissolved Oxygen (25 tests)	**No. 71,361**	**$21.00 Ppd.**

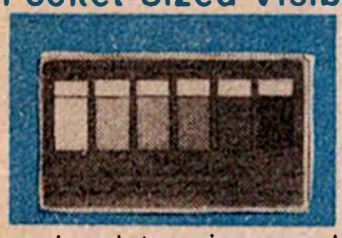
New Pollution Study Charts, see page 23.

Activated Charcoal

Experiment with over 2½ lb. of granular activated carbon, a versatile modern material important in the control of air and water pollution. (Not used for human foods.) Used by hobbyists, ecologists, experimenters, pollution buffs to trap odors and fumes in non-ducted areas, to filter out cigarette smoke, and to reduce air pollution from cars, plus many other interesting experiments and Science Fair projects. Instr. incl.
No. 71,603 $3.25 Ppd.

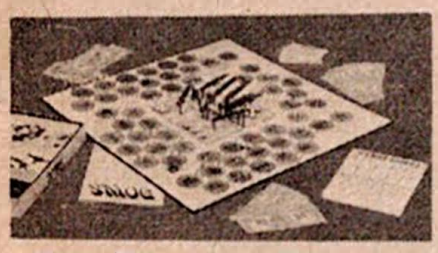
Air Pollution . . . How Can You Find It?

Pocket-Sized Visible Air Pollution Indicator



Determine pollution density anywhere, easily, in seconds with this view-thru 3 x 5" low cost, durable, plastic indicator. Full Ringlemann scale (0-5), developed from U.S. Bureau of Mines data, and opacity scale; determine smoke density regardless of color. Can be used by police to assist pollution control agencies enforce near-zero visible emission laws. Instr. incl.

No. 41,563 $2.00 Ppd.
Pkg. of 5 No. P-41,564 $8.00 Ppd.



2 Games Teach Pollution Control

Smog illustrates the complex problem of air pollution and teaches players about actual abatement techniques. **No. 71,321 $7.95 Ppd.**

Clean Water: Each player is in charge of a lake and tries to provide it with a proper ratio of organisms to be ecologically balanced. You learn about various types of polluters. **No. 71,320 $7.95 Ppd.**

First Low-Cost Air Pollution Tester

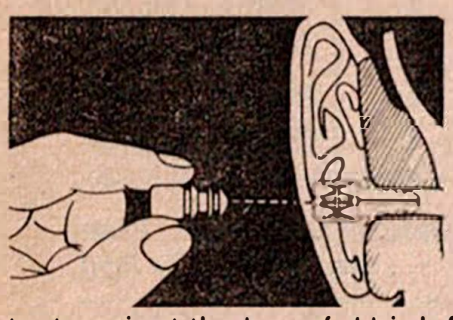
A low-cost, quick, easy-to-use kit to sample and test pollutant gases in threshold limit ranges set up by American Conference of Governmental Industrial Hygienists. Quantitative results in a few minutes. Sensitivity, accuracy, wide measuring range, portability, lightweight, make it ideal for use by safety engineers, industrial hygienists, pollution control officers, teachers, students. Kit contains sturdy plastic sampling pump; coupling tube; 10 ready-to-use, break-tip test ampoules (2 each for: CO_2, CO, H_2S, NO_2, SO_2); and instr. with scales for determining results.

Test for: Carbon Dioxide (CO_2) .01-10% by volume; Carbon Monoxide (CO) 10-3000 Ppm; Hydrogen Sulfide (H_2S) 1-800 Ppm; Nitrogen Dioxide (NO_2) 1-50 Ppm, and Sulfur Dioxide (SO_2) 1-400 Ppm. Replacement ampoules available.

Complete Kit	**No. 71,349**	**$23.50 Ppd.**
(4) CO_2 Ampoules	**No. P-60,833**	**6.50 Ppd.**
(4) CO Ampoules	**No. P-60,834**	**5.25 Ppd.**
(4) H_2S Ampoules	**No. P-60,835**	**6.25 Ppd.**
(4) NO_2 Ampoules	**No. P-60,836**	**6.50 Ppd.**
(4) SO_2 Ampoules	**No. P-60,837**	**8.00 Ppd.**

Noise Pollution . . . A Problem Of The Times

Millions of American workers have hearing problems and should be wearing ear protectors against noise pollution. Loss of hearing occurs gradually since the victim has no idea of what's ahead. Besides loudness, continuous exposure causes ear damage. The best solution to noise pollution, short of ending noise, are ear protectors. Remember, deafness is forever!



(A) Ear Valves. Safeguard hearing by controlling the passage of sound into the ear canal. These precision built devices permit normal relaxed hearing under all conditions (you can hear a whisper!), yet filter and protect against the harmful high frequency part of loud noise. Unlike with earplugs, the ear canal remains open to normal air circulation, reducing possible problems of dizziness and temperature change. Workers are able to better hear instructions, machine irregularities, etc. (without removing), reducing possibility of accidents. Special formula silicone-rubber ear-insert assures maximum comfort . . . may be sterilized . . . non-allergenic . . . non toxic . . . resistant to ear wax and natural skin oils. Last indefinitely. Universal size fits most ears. Widely accepted.

No. 41,464 $4.95 Ppd.

(B) Adjustable Ear Muff Hearing/Protector. A lightweight (6 oz.), comfortable, and highly effective "ear muff" protector. Ideal for shooters. Noise suppression power ranges from 25 decibels at 500 cycles per sec. to 45 at 4,000. Normal conversations can be heard at average speaking distances. Adjustable head band fits all sizes. Washable. Instr. incl. The best we've seen for the money. **No. 71,569 $8.95 Ppd.**

Swedish Wool® . . . Your Personal Ear Protector

Gives the ear protection of soft plastic earplugs with the comfort of soft, fluffy cotton. Easy to use: just tear off, roll, and insert in ear. Attenuation best in 2000-4000 Hz range. Approved by U.S. Dept. of Labor and used all over the world in factories. Made of glass down with a .001 to .002mm dia. Instr. incl. 3gm. pkg.

Pkg. of 2 (enough for 20 sets) **No. P-41,779 $1.98 Ppd.**
Pkg. of 12 No. P-41,780 $10.00 Ppd.

Portable Noise Pollution Meter

Even an untrained operator can easily check noise level just by pressing a button and watching a needle. Measure sounds at construction sites, factories, in the street, or other high noise areas. RCA Meter indicates whether sound levels exceed limits specified by the Walsh-Healey Act and other applicable laws in your area. Calibrated from 70 to 110 decibels divided into 3 areas: green for safe (70-85 dba); yellow for warning (85-90 dba); and red for unsafe at prolonged exposure (90-100 dba). Also use for a quick check of guitar amplifiers & phonographs, or effectiveness of insulating tiles, etc. High impact plastic unit: 1-15/16 x 3 x 6-7/8"; wt. 11¼ oz. Batteries, leatherette carrying case, & instr. incl. **No. 1626 $83.50 Ppd**

"Anti-Pollution Lab" by E. Blaustein

The best ecology book we've seen! Elementary research, experiments, and science projects (total of 42) on air, water, and solid pollution in your community. Provides the "know-how" to approach pollution on a scientific basis. Paperback; 5½ x 8"; 128 pp.

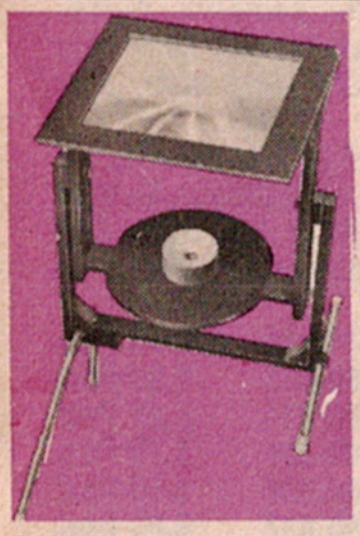
No. 9437 $2.25 Ppd.

SOLAR ENERGY

Spins continuously at 3,000 RPM from heat of sun or light bulb . . . CROOKE'S RADIOMETER

Set it by your window. Powered by the heat of bright sunlight alone, this fascinating solar rotor spins at the fantastic rate of 3,000 revolutions per minute. Operates under ordinary light bulbs . . . even under the invisible infrared radiation such as that emitted by a glowing cigarette. Requires no fuel, no lubrication, no repairs. Everyone loves to watch it, to learn about this power source so vital and promising to man's future, this almost unexpendable power source of solar energy. **This is a first-surface silvered model.** Silvering on one half makes it an interesting conversation piece for home or office. Gives you a hemispherical mirror. Turn radiometer until mirror faces you—at a glance you see a panoramic view of everything going on around and behind you. Clear and sharp. Attractive desk piece 5" high x 3" in dia. Partial vacuum in glass globe where 4 vanes spin on a low-friction, needle-point bearing. **No. 60,529 $4.25 Ppd.**

As above, but unsilvered. No. 60,082 $2.75 Ppd.



Harness the Incredible Heat of the Sun for Experimenting

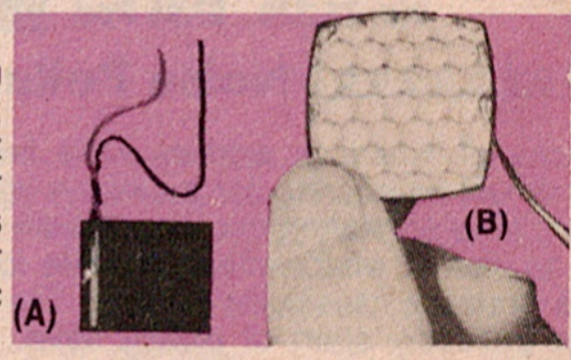
Make A 2000° Solar Furnace

For only a few dollars you can build a simple, easy-to-make Solar Furnace using this Fresnel Lens and some scrap parts. It will develop temperatures of 2,000° within the area of the focus spot. Just focus the noonday sun on a newspaper and it will burst into flame in half a minute. Make a barbecue grill for cooking hot dogs! Use the sun for soldering and brazing. Temper small flat springs. Fire enamel on jewelry.

Fresnel lens is 11-7/8" square; 13½" F.L. It is 3/32" thick and has an effective speed of about f/1.35. Only the lens is furnished, [you must supply the wood and other parts for the furnace]. Includes booklet No. 9053 below. **No. 70,533 $4.00 Ppd.**

"Fun With Fresnel Lenses." Build a "Fresnel" project: image brightener, solar furnace, camp cooker, overhead projector, or camera obscura (instr. incl.)! Illus.; 8½ x 11"; 16pp; paperback. **No. 9053 40¢ Ppd.**

Turn Sunshine Into Electricity With Selenium & Silicon Solar Cells

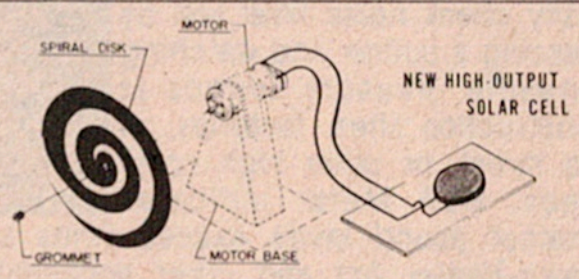


These solid-state devices produce electricity directly from light. The selenium cell has a spectral response that closely approximates that of the human eye; therefore, it is the type most often used in photometric applications such as light meters, densitometers, etc. The silicon cell has a greater response in the near infrared region and is more efficient under incandescent illumination. Both types of cells can be used for powering small transistor radios, building burglar alarms, headlight-activated garage doors, automatic light controls, automatic stops for tape recorders, sun-tracking devices for solar furnaces, etc.

Item	Size	IR No.	Output in Full Sunlight		Pkg. Of	No.	Price
(A) Selenium	5/8 x 3/4 x 1/32"		.1 to .4v	1 to 4Ma	4	41,502	$2.00
(A) Selenium	1-3/8 x 1-9/16 x 1/32"		.2 to .5v	6 to 12Ma	1	30,728	1.50
(B) Silicon in molded case	1-1/8 x 1-1/8 x 3/16"	S1M	.3 to .45v	10 to 16Ma	1	60,216	2.40
(B) Silicon; high efficiency	1-1/8 x 1-1/8 x 3/16"	S4M	.5v	up to 40Ma	1	60,397*	5.00

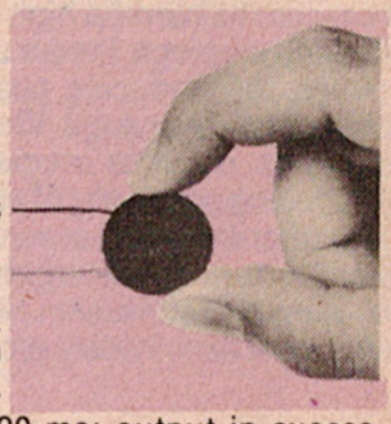
***"Solar Cell Experimenters Handbook" by D. Stoner. A guide to solar cells with 13 complete experiments. Even build a sun powered radio! Illus.; 4 x 6"; 24pp; pprbk. (Included w/#60,397 above.) No. 9124 50¢ Ppd.**

Solar Conversion Unit



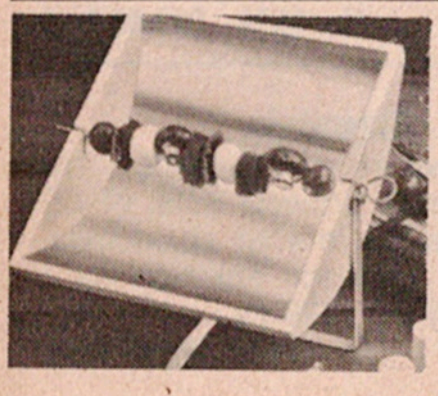
Shows how sun's radiant energy can be converted to electricity to run a small motor. Relatively high conversion efficiency . . . runs small model boats and (with suitable gearing) cars, trucks, etc. Works well even under strong incandescent illumination. Includes high-output silicon solar cell (No. 30,538), 0.35-1.5v DC motor, spiral cardboard disc, grommet, instr. (no motor support or cell mount). **No. 60,505 $18.00 Ppd.**

High-Output Silicon Solar Cell



"One Of The Finest I've Ever Seen," says our Engr.

Small yet extremely powerful, this cell permits applications formerly impossible . . . use in solar powered boats, toy cars, etc. Exposed to bright sunlight this cell delivers more than 1/10 amp. current. Open circuit voltage 0.5v; short circuit current 100 ma; output in excess of 20 mw. Color coded leads. Cell is 15/16" in dia. and less than 1/16" thick. **No. 30,538 $11.95 Ppd.**



Let The Sunshine Cook Your Food

Portable Solar Cooker

Use the sun to cook your food . . . pollution-free, safe, simple and with no mess, no smoke, no fuel, no flame. All you need is this solar cooker and a sunny day. Put food on skewer, wrap with solar foil, insert skewer, focus cooker, and you're ready. Cooker focuses sunrays and normally cooks skewered food in just 10-15 minutes in high sun. Great for solar energy demos. too! 13 x 13 x 4" expanded polystyrene Cooker is lightweight (less than 1 lb.); features sun tracking device, skewer lock, reflector, adjustable stand, and includes skewer (40) 7 x 12" sheets of solar foil, instructions and sun recipes. **No. 71,653 $10.75 Ppd.**

40 Extra sheets of Solar Foil. **No. 41,748 $2.25 Ppd.**

Surplus Cadmium Sulfide Photocells

NOT AVAILABLE

Sensitive to light in the green-yellow range, their resistance varies in response to illumination changes. Max. power dissipation 0.3 watts. ½" dia., 5/16" thick. Wire leads, instr. incl.
Package of 2 No. P-41,108 $1.25 Ppd.

Surplus Photocell Relay System. Cad. Sulphide cell, relay, etc. Instr. **No. 60,662 $6.00 Ppd.**

"Solar House Models" by Harry E. Thomason

Learn the advantages and savings possible by living in a solar house. Covers details on construction of 5 solar homes with sidelights on living in one. Illus.; 8½ x 11"; 35 pp; paperback. **No. 9069 $1.00 Ppd.**

"Solar House Plans" by Dr. Harry E. Thomason

20 fact-filled pages of text and illustrations on Solar Homes . . . advantages, problems, savings, and more . . . 8 oversized pages of basic solar house plans. Plans serve as great guidelines for your architect in fitting your space requirements, design ideas, and local area building codes. To build house, a license from Dr. Thomason is necessary (see below). Booklet plus 8-pg. plan insert. **No. 9440 $10.00 Ppd.**

Solar House License—To order, state name and address of site (incl. block and lot #). **No. 9441 $20.00 Ppd.**

Photo And Sun Bathing Reflectors

Handle the high contrast picture problem with a low-cost, highly efficient reflector that fills in shadow areas, gives pleasing detail in all portions of pictures. Aluminized mylar cemented to big, durable sheets of smooth, white, card stock. Gives extremely high reflectivity, excellent for photography, constructing a sunbathing reflector, heat reflection experimenting, building solar cooker, holiday decorations. Cut to any size or shape, rolls up for easy carrying. 48 x 42", approx .015" thick. Sheets may have small faint creases, will not affect their reflectivity. **No. 80,087 $3.00 Ppd.**

Miniature DC Motor Runs Off Solar Cells

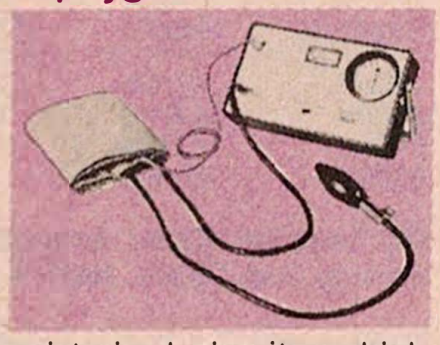
Use in Science Fairs!
I.R. motor, 1-11/16 x 1-1/32" dia.; spring bronze brushes; self-aligning bronze bearings; metal and plastic housing. Operates on 0.35-1.5v DC. Shaft, .078" dia., extends 5/16", 3/8" dia. V-groove pulley incl. **No. 40,872 $5.20 Ppd.**

More Motors, see page 20.

MEDICAL AIDS

Some of the items on this page (i.e. stethoscopes) are not only useful in their original medical applications, but are also helpful to science projects, hobbyists, industry, auto & TV repairmen, etc.

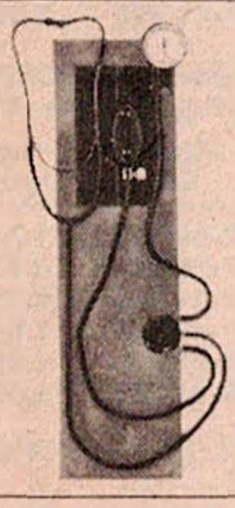
Transistorized Electronic Sphygmomanometer



This accurate hemo-sphyg provides consistent readings without the use of a stethoscope. Anyone can use it . . . so easy to read. The readings come directly from a highly sensitive microphone that's part of the velcro arm cuff. Readings are relayed through the transistorized circuitry which lights a flashing red light for visual interpretation of blood pressure level. Also has a sensitive pulse meter for measuring phases of Korotkoff sounds from first to fifth. Completely portable: runs on (4) 1.5v batteries (incl.). Wt. 3 lb. Instr. **No. 1636 $109.00 Ppd.**

Transistorized Electronic Stethoscope

Amplifies sound up to 10,000 times and eliminates extraneous sounds. Hear better; diagnose better . . . whether your patients are people, sick engines, or industrial equipment. Completely portable, the electronic case clips to shirt pocket (measures just 1 x 2 x 5½"). System includes case, binaural headpiece, 2 chestpieces (flat and bell type), coiled telephone-type cord, 10-stage volume control, batteries, and leather carrying case. Auxiliary receptacle allows for hook up to amplifiers, speakers, tape recorders, or a second set of binaurals (so 2 people can listen simultaneously). Instr. incl.
No. 71,714 $106.25 Ppd.



Combination Stethoscope/ Blood Pressure Gauge

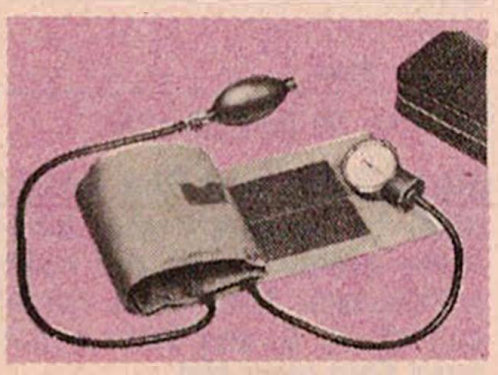
This deluxe stetho/sphyg combination makes blood pressure reading a snap. No more fumbling with outside stethoscopes. This device has the stethoscope built right into the velcro cuff. Features 20-300mm aneroid manometer, rubber bulb, metal binaural stethoscope; case; Instr. Wt. 1½ lb. 7 x 3 x 5". **No. 71,874 $29.95 Ppd.**

Low-Cost Stethoscope

A real bargain! Diagnose engine troubles, check strains and leaks. Useful in detecting fluid, air, and gas leakage. Also many hobby applications and educational uses.
No. 50,223 $3.75 Ppd.

Blood Pressure Gauge

Check pressure with aneroid-type Sphygmomanometer. Compact, portable; bulb, cuff & 20 to 300mm scale. Case. Imported.
No. 50,271 $20.50 Ppd.



Combination-Type Stethoscope

A sensitive stethoscope originally designed for use by physicians. A combination of a bell and diaphragm with manual switch for personal selection. Extra sensitive, it is also ideal for use by engineers, mechanics and others to check trouble spots in motors, liquid flow, etc. Through the magnification of usually inaudible sounds, you can trace feedline clogging, improper piston firing.

No. 50,270 $9.25 Ppd.

CHEMISTRY

TOP QUALITY GLASSWARE

Where do you now go to get your lab equipment, those special shaped glass containers important for hundreds of uses in industry, schools, and home? Buy them from us at our low quantity prices or individually—great for scientific and testing labs, industry, hobbyists, and students. By group purchasing, either alone or together with friends or business associates, you save many dollars as you fill your glassware needs from quality lines. Look over the typical individual items and special popular priced sets shown here; you'll soon learn it pays, and is more convenient to do your glassware shopping at Edmund's. Send us your order today!

CHEMISTRY GLASSWARE SETS

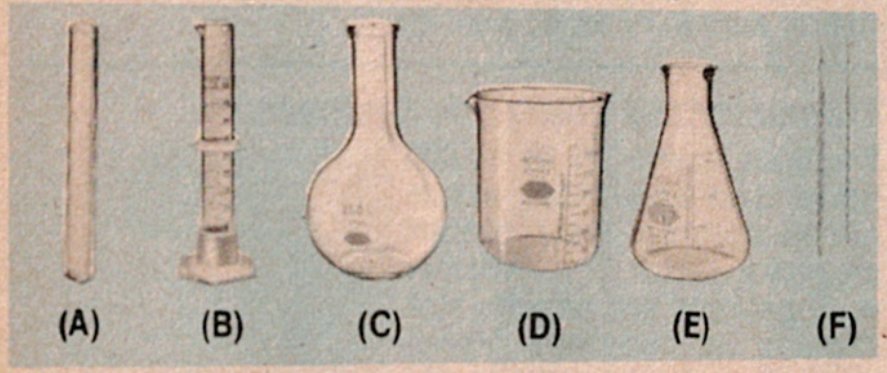
16 Pc. Starter Set And 31 Pc. Advanced Set

Top-quality, accurate labware of heat-resistant Kimax® glass. Perfect for job, school, or home experiment use by students, hobbyists, experimenters, and professionals. Easy-to-read calibrations; easy-pour spouts; smooth-but-durable lips. Economical Sets include most needed labware at low price.

16 Pc. Starter Set includes: (5) 13 x 100mm and (5) 16 x 150mm test tubes; (1) 400ml and 250ml graduated beakers; (1) 50 ml graduated cylinder with plastic base and bumper; (1) 60 ml poly dropper bottle; (2) 1ml graduated pipets. **No. 71,481 $4.95 Ppd.**

31 Pc. Advanced Set (illus.) includes all of above plus: (1) 50ml and 125ml Erlenmeyer flasks; (5) 18 x 150mm test tubes; (1) 250ml boiling flask; (3) stirring rods; (2) #4 & #6 snap-cap cover stoppers. **No. 71,482 $10.95 Ppd.**

Specialized Quality Glassware—Heat-Resistant Kimax®



(A) Test Tubes: Sturdy lips; marking spots; uniform tubing; Kimax® as little as 8.2¢ each.

O.D. x Length	Capacity	Qty.	Stock No.	Price, Ppd.
10 x 75mm	4ml	72	**P-60,889**	**$ 6.25**
12 x 75mm	6ml	6	**P-41,847**	**1.00**
13 x 100mm	10ml	72	**P-71,494**	**7.25**
13 x 100mm	10ml	6	**P-41,848**	**1.25**
16 x 150mm	24ml	72	**P-71,495**	**9.25**
16 x 150mm	24ml	6	**P-41,849**	**1.50**
18 x 150mm	28ml	72	**P-71,496**	**10.75**
20 x 150mm	36ml	72	**P-71,497**	**12.25**

(B) Graduated Cylinders with removable plastic bases and safeguard bumpers. Calibrated to deliver. Sturdy borosilicate glass (not heat resistant).

Graduated	Height	Qty.	Stock No.	Price, Ppd.
10ml in .2ml	132mm	6	**P-71,487**	**$ 7.75**
10ml in .2ml	132mm	1	**P-41,850**	**2.00**
50ml in 1ml	185mm	1	**P-41,851**	**2.50**
100ml in 1ml	248mm	6	**P-71,488**	**12.75**
100ml in 1ml	248mm	1	**P-41,852**	**3.00**

Flexible Vinyl Tubing . . . For labs, classrooms, home experiments, hobbyists . . . new, fresh, first-run, single-size 1/16" wall, transparent tubing manufactured for lab use (not FDA approved for foods).

Length	I.D.	Stock No.	Price, Ppd.
10-ft.	1/2"	**41,657**	**$4.00**
15	3/8"	**41,658**	**4.80**
15	5/16"	**41,659**	**4.15**
20	1/4"	**41,660**	**4.35**
20	3/16"	**41,661**	**4.75**
25	1/8"	**41,662**	**7.75**

(C) Boiling Flasks, with flat bottoms, reinforced tooled tops. Comply with Fed. Specs. NNN-F-240, Kimax®

Capacity	Height	Qty.	Stock No.	Price, Ppd.
50ml	92mm	12	**P-71,489**	**$15.25**
250ml	143mm	12	**P-71,490**	**17.50**
500ml	182mm	6	**P-71,491**	**11.50**
500ml	182mm	1	**P-41,853**	**2.25**

(D) Beakers, flared, beaded top; spouts; marking spot; comply Fed. Specs. NNN-B-175. Kimax®

Graduated	O.D. x Height	Qty.	Stock No.	Price, Ppd.
20ml, in 5ml	32 x 40	12	**P-60,883**	**$10.25**
100ml, in 10ml	50 x 71	12	**P-71,483**	**9.25**
250ml, in 25ml	68 x 88	12	**P-71,484**	**8.25**
250ml, in 25ml	68 x 88	1	**P-41,854**	**1.60**
400ml, in 25ml	77 x 106	12	**P-71,485**	**10.25**
400ml, in 25ml	77 x 106	1	**P-41,855**	**1.75**
1000ml, in 50ml	107 x 145	6	**P-71,486**	**11.25**
1000ml, in 50ml	107 x 145	1	**P-41,856**	**2.50**

(E) Erlenmeyer Flasks, narrow mouth; heavy-duty tops; marking spots; comply Fed. Specs. NNN-F-240. Kimax®

Graduated	Dia. x Height	Qty.	Stock No.	Price, Ppd.
10ml, in 5ml	32 x 50mm	12	**P-60,885**	**$11.75**
50ml, in 10ml	50 x 78mm	12	**P-60,886**	**10.75**
125ml, in 25ml	66 x 108mm	12	**P-71,492**	**10.25**
125ml, in 25ml	66 x 108mm	1	**P-41,857**	**1.65**
500ml, in 50ml	102 x 174mm	6	**P-71,493**	**6.50**
500ml, in 50ml	102 x 174mm	1	**P-41,858**	**3.00**

(F) Disposable Pipettes made of Kimble Boroscilicate glass. 1/10ml marked sub-divisions.

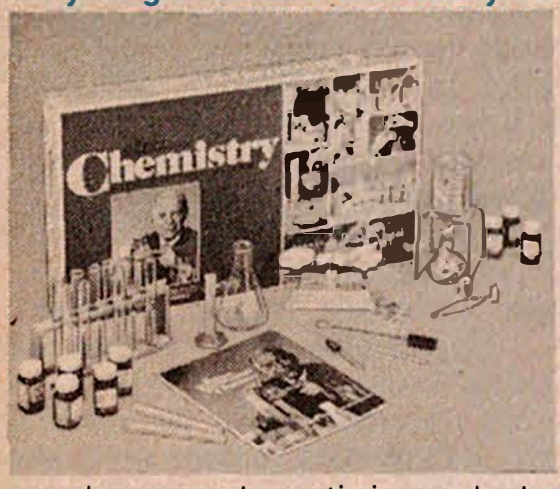
Size	Qty.	Stock No.	Price, Ppd.
(6) 1ml; (4) 5ml; (2) 10ml	12	**P-60,927**	**$3.00**

Glass Tube and Rod Assortment

Ideal for research labs, biology and chemistry labs, home experimenters and hobbyists, and glass-working enthusiasts. Assortment contains 2-ft. lengths (4 pcs. ea.) of: 4, 6, and 9mm apparatus tubing; and 4 and 6mm Flint glass rod. **No. 71,613 $5.95 Ppd.**

U + = $$4U.

Mr. Wizard CHEMISTRY LAB SETS . . .
for young scientists and hobbyists

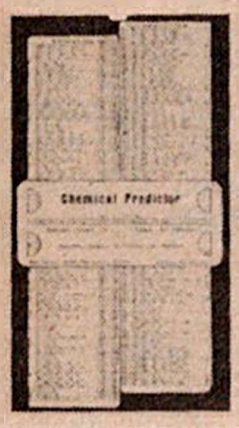


(A) Economy Size Chemistry Set—Ideal set for beginning experimenters from 9 to 16 years. Contains ample starter materials for hours of educational experiments! You get: plastic beaker; 6 test tubes & cleaning brush; test tube holder; eye dropper; glass stirring rod; alcohol lamp with cap; 8 vials of chemicals; instr. booklet. **No. 71,499 $9.50 Ppd.**
(B) Deluxe Chemistry Lab Set (illus.)—Includes all of above set, plus a fine 76-page instr. booklet (described below), and: glass Erlenmeyer flask; plastic graduated cylinder; balance scale & gram weights; and 6 additional test tubes plus rack. **No. 71,498 $22.50 Ppd.**
"Experiments in Chemistry" Illus. experiment & workbook. 76 pages present many experiments using readily obtainable chemicals and foods found in the home. Pprbk; 8½ x 11". (Incl. with Set B.) **No. 9430 $2.95 Ppd.**

Low-Cost Gas Assortment

Right at your fingertips!
Oxygen Argon Helium
Carbon Dioxide Nitrogen
Don't experiment with large, expensive, cylinders of gas . . . now you can buy a low-cost sample package of 5 gases. The ideal solution to supply problems for school demonstrations, research labs, and science projects. Easily demonstrate the variables of the gases . . . or use as convenient pure gas sources for Boyle's Law, Charles' Law, etc. Six 12.1 liter aerosol cans: oxygen; carbon dioxide; argon; nitrogen; and 2 cans of helium. **No. P-71,546 $17.00 Ppd.**

Gases available individually in 12.1 liter aerosol cans. **Each $3.50 Ppd.**
Helium No. 60,935 **Argon No. 60,938**
Oxygen No. 60,936 **Nitrogen No. 60,939**
Carbon Dioxide No. 60,937



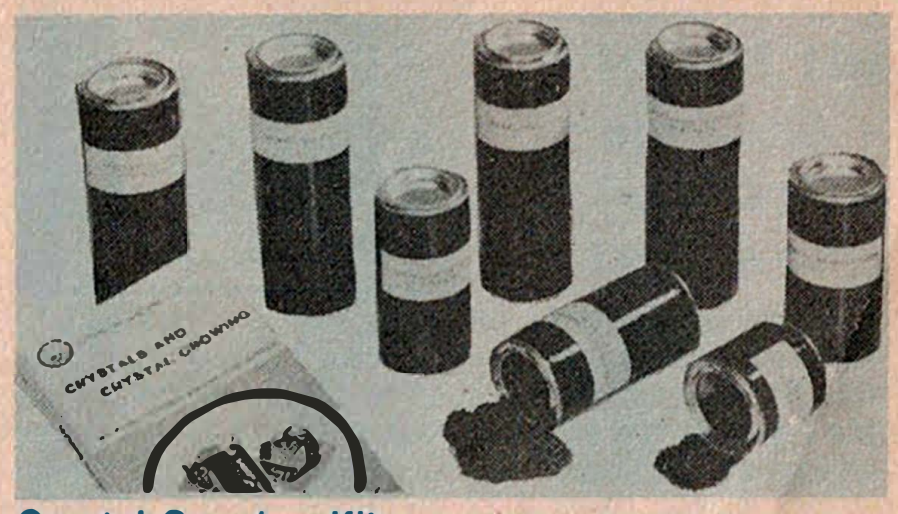
Predict and Illustrate Over 30,000 Chemical Reactions

Ideal for teachers and jr. & sr. high school students. Chemical Predictor has 2 charts of equations arranged so any combination can be instantly selected to furnish the detailed equation for the chemical reaction. Numerical data shows if a reaction can occur, its extent & products. Manila-like stock, coated. 5½ x 11". **No. 40,752 95¢ Ppd.**

Indicator Paper Assortment

100 strips each of commonly used chemical test papers. Test pH, chemicals, moisture, even a genetic trait. You get litmus red, blue, and neutral; a universal pH; phenolphthalein, methyl violet, clayton yellow, congo red, plus 7 other; instr.
No. 41,727 $4.00 Ppd.

Line Spectrum & Monochromatic Light Sources, p. 158.
Spectroscope Kit, see page 156.
A chemical wet show? See Clock Crystals on page 115.

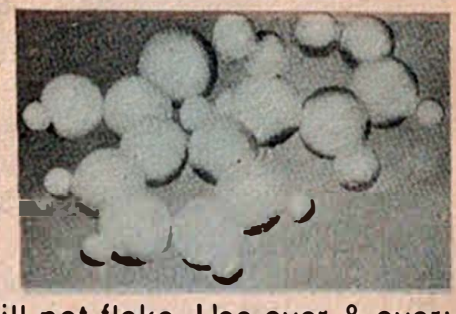


Crystal Growing Kit

Do a crystallography project and illustrate with large beautiful crystals you grew yourself. Kit includes "Crystals and Crystal Growing" by Holden and Singer, plus a generous supply of the chemicals you need to grow large display crystals of: potassium and aluminum sulfate (clear), potassium chromium sulfate (purple), potassium sodium tartrate (clear), nickel sulfate hexahydrate (blue green) or heptahydrate (green), potassium ferricyanide (red), and copper acetate (blue green).

Study and demonstrate factors affecting growth, refraction in crystals, the piezoelectric effect, crystal symmetry, etc. A perfect Science Fair project kit. Complete crystal kit. **No. 70,336 $12.50 Ppd.**

Closed Molecular Model Kit

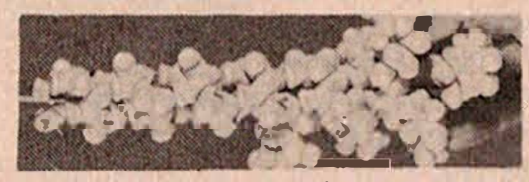


Connectors won't pop, break or rust. Molded balls of expanded polystyrene have extra smooth surface. Extremely lightweight & firm . . . resist pressure, will not flake. Use over & over; color & cut with a knife. Kit incl. 100 balls ranging from .5" to 3.87"; plus 80 (1") & 20 (1½") connectors; 50 red & 50 black pins for representing electrons; and instr.
No. 70,771 $15.00 Ppd.

Individual Plastic Foam Balls

Size	Pkg. of	Stock No.	Price Ppd.	Size	Pkg. of	Stock No.	Price Ppd.
.50"	100	P-70,752	$3.25	1.25"	100	P-70,756	$3.55
.75	100	P-70,753	3.60	1.50	100	P-70,759	4.30
1.00	100	P-70,755	3.60	2.50	25	P-70,766	2.75

50 (1") Atom Connectors **No. P-40,842 $2.50 Ppd.**



Accurate Pre-Grouped Molecular Models

A series of small pre-grouped clusters of atoms to make the study of complex organic molecules easier. Study spatial relationships, steric hindrance, bond angles, intra-molecular distances, etc. Strong white plastic (can be painted). Average atom dia. 12mm. Reusable connectors. Instr. incl.

Kit AA for tripeptide. 25 pc. **No. P-40,825 $10.00 Ppd.**

Kit BB for polypeptide with 1 of each of common amino acids. 128 pc. **No. P-70,802 $45.00 Ppd.**

Surplus Hydrometer Bonanza . . . $3.00

Measure specific gravity and concentration of liquids. 3 models to choose from; $3.00 each.

Type	Length	Scale	Intervals	Range	No.
Baumé	300mm	130mm	.1	57-67°	71,768
Baumé	300mm	130mm	.1	40-50°	71,769
Alcohol	225mm	100mm	1%	100-200%	71,771

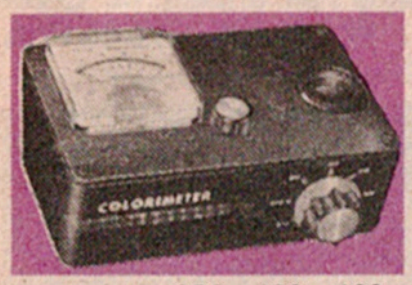
Portable pH Meter . . .

- *Accurate*
- *Fast*
- *Low Cost*

A handy very-portable pH meter that you can take for field use. Great for ecologists, school use, and industry, too. No need to take the solution to the pH meter. Take the meter to the solution. Also good for photo lab pH checks on developers, etc. Compact (3 x 4 x 2"), high-impact plastic case; 2-12 pH range, in 0.1 pH increments; accuracy ±0.15 pH. 0.2 pH over full scale. Has "no-fill" combination electrode, temperature compensation adjustment, battery check, easy-read dial, BNC connector with Teflon insulator, plastic carrying case. 2 standarized buffer solutions, distilled H_2O, reference solution, 9v carbon-zinc battery (NEDA 1604 incl.), and instructions. All in all a low-cost, portable instrument that's fast, accurate, and reliable.

71,878 $110.00 Ppd.

Replacement Electrode No. 42,026 $41.00 Ppd.

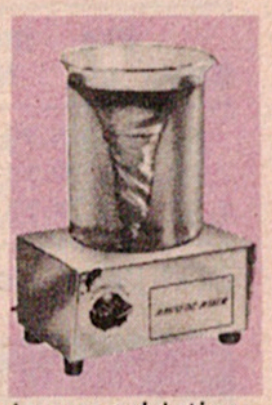


Low-Cost Colorimeter
For Quality Control & Pollution Analysis

Durable, reliable, simple to operate! Ideal for on-the-spot testing. 8 narrow band pass filters: wavelength peaks at 350, 420, 460, 490, 530, 570, 610 & 660nm. Easy-to-read transmittance & absorbance meter scale. Accuracy typically 2%. Solid state electronics. 3 x 4½ x 6"; wt. under 2 lb. 120v AC cord (220v AC, 12v DC cord available on spec. order); (4) 17mm O.D. cells; & 42-page instr. manual incl. **No. 71,544 $87.00 Ppd.***

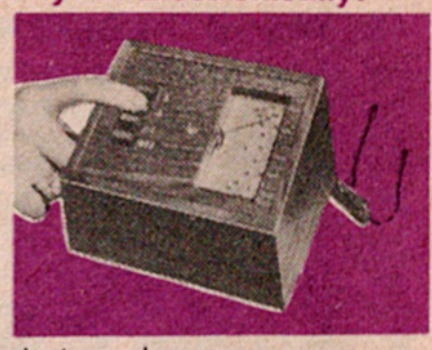
*Price includes shipping & handling.

Magnetic Mixer . . . Takes Mess & Trouble Out Of Quickly Stirring Solutions



Efficient way to mix chemicals! Prepare solutions with cooler water to reduce temp. stabilization times. Takes containers up to 3½-gal. capacity & thoroughly mixes solutions as thick as 30-wt. motor oil. Mixing speed adj. from 50-3000 rpm. Provides smooth mixing action for uniformity & slower oxidation. Teflon-coated magnetic mixing bar cannot corrode or contaminate; easily cleaned. 4½ x 3 x 6". 115v AC, 50-60 cycle power. Instr. **No. 71,263 $44.50 Ppd.**

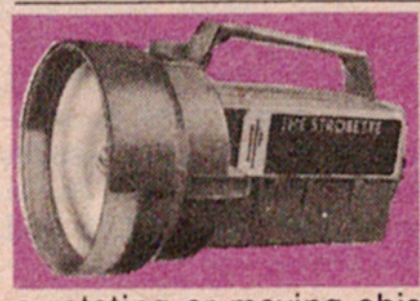
Measure Temperature Instantly . . . Electronically!



Just push a button and read one of 3 separate temps., located at different distances from inches to 1,000-ft. away. Useful to industry, schools & home-owners. Gardeners monitor hot house temps.; photographers . . . processing solutions; biologists . . . incubators; home-owners . . . inside, swimming pools, aquariums, freezer. Thermometer can connect to 3 plug-in type temp. probes with flexible conductor cords. Instant reading from -22 to +122°F. and -30 to +50°C. Accuracy ±1%. Walnut finish cabinet 3½ x 4½ x 6¾". 2 solid-state, waterproof probes (one, 18" cable; second 15-ft.) & instr. incl. Requires "D" battery (not incl.). **No. 71,741 $49.00 Ppd.**

Extra 15-ft. Probe No. 41,839 $ 8.00 Ppd.

50-ft. Extension Cord No. 41,838 $ 6.00 Ppd.



Stroboscope-Tachometer . . . Both In One Unit!

As a stroboscope, it optically stops and or slows the motion of any moving object; as a tachometer, it measures the speed (rate of motion) of a rotating or moving object. Great for troubleshooting! Check printing register, motor speed, etc. Stop motion of fans, turbines, wheels, etc. Or demonstrate strobe action in schools! 7" long; high impact plastic construction. 4" dia. reflector, tripod socket & Xenon flash tube (continuously variable flash rate from 200-6,000 rpm). Calibrated dial gives rpm speed. 115v AC, 50/60 Hz. Wt. 27 oz. **No. 71,500 $96.50 Ppd.**

Lasers & a complete line of Laser Accessories are located on pages 151-154. Holographic items, pg. 155.

Portable Bunsen Burner

• Instant Lighting • Clean Burning

The ideal burner for classrooms or laboratories! Completely portable and lightweight . . . produces a hot, clean flame . . . and burns over 7 hours on one inexpensive fuel container. Finger control for complete air control . . . produces soft controlled flame or hot blast. Burner uses a special laboratory blend of Butane as fuel, eliminating need for outside gas cylinders. Container is disposable, just attach another when empty. Safe for school use; fuel container approved by the I.C.C. Fits under standard 9" tripod. Stabilizer top 11/16" O.D. Fuel, net wt. 6 oz. Instr. incl. **No. 71,556 $8.95 Ppd.**

Fuel Replacement for above **No. 41,672 $2.10 Ppd.**

Flame Spreader for broad flat flame used in bending glass tubing. Fits on burner head **No. 41,673 $1.75 Ppd.**

UNIQUE NEW

Dry Ice Maker

Dry ice . . . Any quantity . . . Instantly . . . At low cost

This new Dry Ice Maker is a completely mechanical attachment that fits any standard, syphon-type equipped, carbon dioxide cylinder (available from any welding supply company from $5-14). It provides dry ice automatically and quickly . . . anywhere . . . when needed. 25% CO_2 conversion efficiency. Field and laboratory tested, the Dry Ice Maker eliminates storage problems, is simple to operate and causes no procurement or delivery delays. Makes dry ice convenient for hospitals, pathology and chemistry labs, metallurgy work, commercial cold storage, air and water sampling, schools (cloud chambers, etc.), and sport and commercial fishing. Easy to use: just clamp on collection bag, turn CO_2 valve and "swoosh", a bag full. Maker includes adaptor nozzle, cone, collection bag, clamp, washer, and instructions. **No. 71,533 $41.50 Ppd.**

Extra collection bag. No. 41,626 $1.50 Ppd.

9 Specimen Assortment

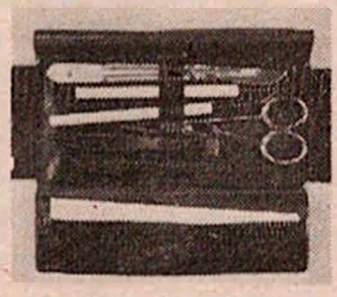
- Crayfish • Frog • Grasshopper
- Perch • Starfish • Earthworm
- Clam • Beetle
- Grantia Sponge

Nine important biological forms of life suitable for dissecting. Perfect for home study. Packed in colorless, odorless, non-toxic preservative solution.

No. 71,645 $4.50 Ppd.

Animal Specimens. Honey bee, beetle, sponge, and sea plankton . . . each preserved in a separate vial. Dissect the bee or beetle and study their internal make-up. Microscopic sea plankton, the most abundant sea creature, can be seen complete under a microscope! Imported. **No. P-41,644 $3.25 Ppd.**

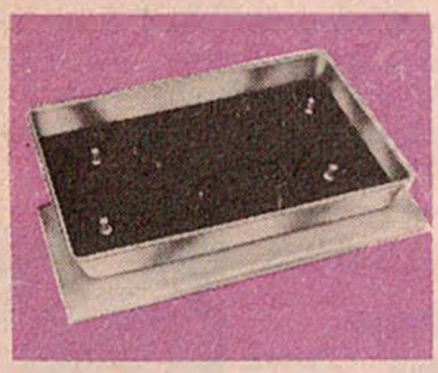
Dissecting Sets



7-Piece Set. Every student of the microscope can use this dissecting set. Comes in neat simulated leather case, ideal for biology, botany, research work, etc. Easy to slip into pocket for field work!

No. 50,002 $5.95 Ppd.

13-Piece Set. **No. 60,394 $12.75 Ppd.**



Dissecting Pan & Pins

Dissect the clean way with no messy spills, leaks, slips. Sturdy aluminum; 11½ x 7½ x 1½"; lined with reusable black dissecting wax. Lasts for yrs. Incl. 4 pins & instr.

No. 71,652 $3.00 Ppd.

Specimen Dye Kit

Stains are an absolute necessity for anyone interested in microscopy. Many specimens are practically colorless when on a slide. The appropriate dyeing fluids add color contrast to create more discernible images without the need of expensive equipment. Kit contains 4 basic stains (safranin, gentian violet, methylene blue, fuchsin), 2 acid stains (eosin, acid fuchsin) and instr. **No. P-41,648 $4.50 Ppd.**

Culture Slides

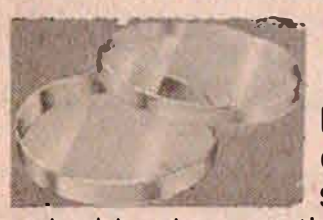
Plastic slides with 19 x 3mm deep well for growing cultures for your experiments. Slide is recessed for exact placement of 22mm square cover slips. Imported.

No. P-41,645 $4.15 Ppd.

Quieting Solution 14% polyvinyl alcohol in 1 oz. dropper bottle. Slow down fast moving organisms for examination without killing. **No. 41,744 $1.50 Ppd.**

Nutrient Agar

A general purpose growing medium for a wide variety of bacterial cultures. 6 oz. **No. 41,815 $2.75 Ppd.**

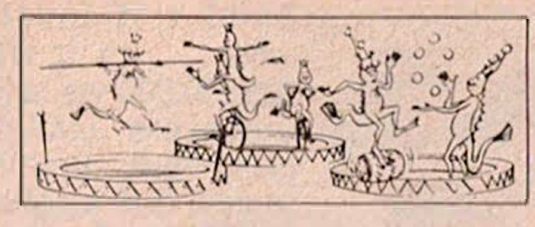


Disposable Plastic Petri Dishes

Essential for experiments in bacteriology. Ideal for students and researchers growing cultures . . . save valuable clean-up time. Top and bottom incl. Approx. 15 x 100mm dia.

Pkg. of 20 **No. P-71,614 $2.75 Ppd.**
Pkg. of 500 **No. P-80,172 $37.00 Ppd.**

The Wonderful World of Sea-Monkeys®

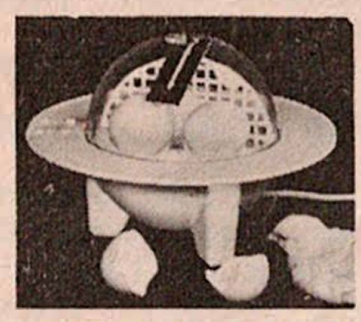


Deluxe Kit containing everything you need to enjoy the fun of raising an adorable Sea-Monkey family! These are the amazing marine animal (Artemia) that exists in a state of suspended animation until immersed in water! Then they come to life instantly . . . after 8-12 weeks they really grow (to ½" easily; females often to ¾"). Kit incl.: water purifier; approx. 300 Sea-Monkey eggs (almost microscopic); living plasma; 1 yr. food supply; vitamins; plastic aquarium (2 x 4 x 5½" tall); aerating ring; stereovue tank cover; & 16-pg. handbook. Fascinating to watch & care for, Sea-Monkeys live for a year or more. **No. 71,815 $5.95 Ppd.**

Raise Protozoa That Live Indefinitely!

3-packets of dried cysts of hundreds of thousands of protozoa, food papers and methyl cellulose. Watch these protozoa change from active, swimming animals to cysts and reverse the process. Completely safe

No. 40,708 $1.75 Ppd.

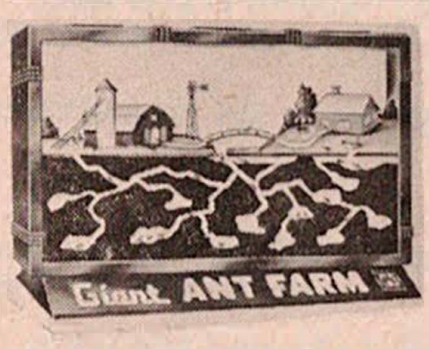


See Life Begin!

Imagine the thrill a youngster will have when he can actually watch a chicken hatch out of an egg. The Chick-U-Bator provides the setting for this experience . . . one a child will probably never forget. Scientifically perfected. Ideal for nature study groups, scouts, science projects, etc. (Note: Unit accepts chicken, duck, pheasant or quail eggs.) Kit contains: high impact styrene incubator with grate holder; ventilating plastic tube; reflecting foil; thermometer; incubating bulb; redemption coupon for 3 fertile quail eggs for hatching; and instr. 6 x 9" dia. 6-ft. cord. **No. 71,277 $7.50 Ppd.**

Sea Horse Corral

Heads like horses, tails like monkeys & pouches like kangaroos? Watch nature's cutest oddity at home! 3½ x 4½ x 5¾" plastic aquarium, post, salts, sand, food, instr. & sea horse certificate incl. Send certificate & 50¢ (shipping & handling) to our supplier for guar. delivery of 3 live, healthy sea horses. **No. 71,170 $5.95 Ppd.**



Giant Size Ant Farm

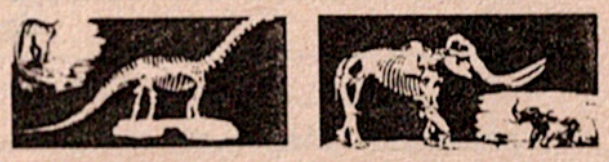
Watch these hardworking, patient ant engineers build rooms and subways. See them sow, reap, harvest, and store food. Heavy, unbreakable plastic 10 x 15" case. With sand, supply of food, ant watcher's manual, and certificate for supply of live ants. Excellent classroom fun.

Giant-Size Ant Farm **No. 70,295 $7.95 Ppd.**
Small-Size Ant Farm. As above, but 6¼x8½". **No. 70,800 $3.95 Ppd.**
"The ANTS" . . . by Dr. W. Goetsch. Paperback, 169 pp. (5-3/8 x 7-7/8"). **No. 9351 $2.95 Ppd.**
Let Your Ants Live Underwater With This Silicone Rubber Membrane. Convert our Giant Ant farm into an underwater ant city. Bonded Silicone Rubber Membrane lets oxygen in and carbon dioxide out, but doesn't let water through! Conversion instr. incl. 3 x 5". **No. 40,824 $5.75 Ppd.**

Have Fun With Prehistoric Dinosaurs & Monsters

Build a dinosaur land . . . as it was 200,000,000 yrs. ago. Dinosaurs include giant 70-ft. Brontosaurus, that weighed 60,000 lb.; Tyrannosaurus Rex, fierce 45-ft. king of meat eaters; plus 8 others. Mammals incl. Woolly Mammoth of the ice age; Smilodon or "Saber-Toothed Tiger"; etc. 22 realistic plastic figures 2 to 6" long. Also 1" dinosaur bone; box of lichen (assorted colors) to make life-like trees and shrubs; 48-pg. book on dinosaurs; instr. for building a dinosaur land with streams, etc. **No. 70,817 $6.00 Ppd.**

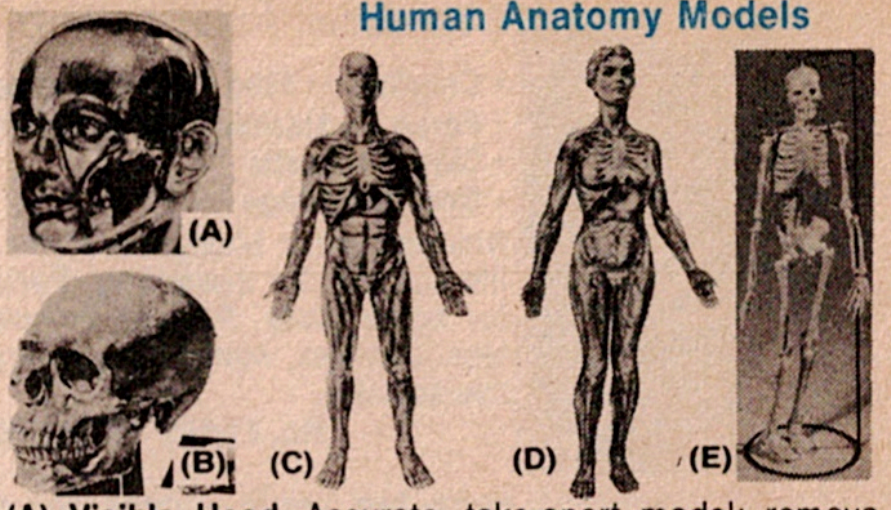
Prehistoric Monsters . . . Two Kits in One!



Start a monster collection of the strangest creatures to exist on earth. These quick, easy-to-build plastic assembly kits scaled from American Museum skeleton restorations are fun for every youngster. Full 13" model of 35-ton giant dinosaur Brontosaurus, 52 pieces; 10" model of 15-foot Mastodon elephant ancestor which roamed America 10-million years ago, 43 pieces.

No. 70,221 $3.00 Ppd.

Human Anatomy Models



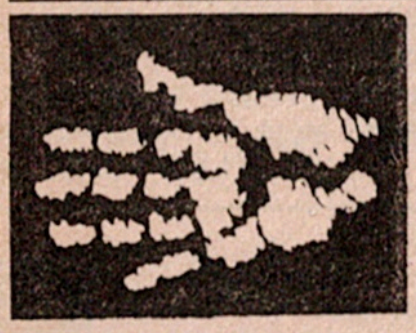
(A) Visible Head. Accurate, take-apart model: remove teeth, disassemble eyes, etc. **No. 70,447 $12.75 Ppd.**
(B) Life-Size Human Skull. Removable skull cap; spring action lower jaw; stand. **No. 71,539 $4.75 Ppd.**
(C) Visible Man. An authentic, take-apart model of the human male. 16" high. **No. 70,228 $6.95 Ppd.**
(D) Visible Woman. Human female, 15½". (Incl. structure for 7-month pregnancy.) **No. 70,283 $6.95 Ppd.**
(E) 12" Scale Model Skeleton. No. 90,022 $5.75 Ppd.

Large Human Anatomy Wall Charts

Set of 14 charts (29 x 37" ea.; printed in color on heavy paper) incl. skeletal, muscular, circulatory, nervous, endocrine, reproductive systems, heart, lungs, brain, position of organs, etc. **No. 70,897 $15.50 Ppd.**

Measure Temperature In Color . . . With Liquid Crystals . . . A Scientific Paradox!

Liquid Crystals (LC) exhibit optical properties of crystalline solids by having ordered structures, but have the mobility of liquid since the structures aren't rigid in 3 dimensions, nor intermolecularly strong. LC change color to each temp. change (as temp. rises, most change from red-orange-yellow-green-blue) & are used for temp. measurement, hot spot detection, etc. 2 basic LC forms: Encapsulated don't contaminate easily & can be used over. Non-encapsulated offer closer contact to surfaces, blend for new temp. ranges, etc.



Ecapsulated Liquid Crystals . . . in sheets

No pre-coating necessary; the 20-30 micron, ELC capsules are already on a substrate (a Mylar sheet). Any heated area shows up on sheet in appropriate color (red thru blue) according to temp. range of sheet. Sheets available in kits, different sizes and temp.

ELC Kits Cover 6 Temp. Ranges

19-25°C (66.2-77°F): Wide; shows evaporative cooling.
29-33°C (84.2-91.4°F): Med.; responds to skin temp.; great for checking PC boards.
30-36°C (86-96.8°F): Wide; responds to skin temp.; dramatic color changes.
33-37°C (91.4-98.6°F): Med.; responds to skin temp.
35.0-36.0°C (95-96.8°F): Very sensitive; shows color changes over 1°C.
45-49°C (113-120.2°F): High temp.; use for electronic & solid-state experiments.

Experimenter's Kit

(6) 4 x 6" Mylar Sheets coated w/ELC, 1 for ea. range. Complete instr. incl. **No. 60,756 $5.50 Ppd.**

Larger Kit for Research Labs and Industry

Same as No. 60,756 but 6 different (larger) 6 x 12" sheets for larger areas. **No. 71,143 $13.95 Ppd.**

Individual Sheets, Lge. 12 x 12" $3.75 ea. Ppd.

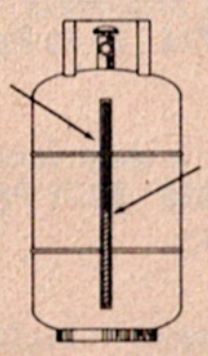
19-25°C	**No. 71,137**	**33-37°C**	**No. 71,139**
25-31°C	**No. 71,249**	**35.0-36.0°C**	**No. 71,141**
29-33°C	**No. 71,138**	**45-49°C**	**No. 71,140**
30-36°C	**No. 71,142**		

Pressure-Responsive LC Discs

Your Own Portable Wet Show!
Pressure-responsive Liquid Crystals sealed between vinyl and clear Plexiglas®, 3 x 3 x ¼". Look at it from different angles and see iridescent colors change. Touch vinyl backing and see colors "bloom" at point of pressure. Create everchanging shapeless patterns that flow and ooze within the circle of confinement. Pkg. of 2 **No. P-41,272 $2.35 Ppd.**
Pkg. of 1 **No. 41,441 $1.50 Ppd.**

Non-Encapsulated Liquid Crystals Kit

Test Hard-to-Reach or Irregularly Shaped Surfaces
Experiment with thermal fingerprints, warm and cool air density, friction heat, exothermic and endothermic reactions, etc. Determine temp. range (18°-71°C) by using different amounts of each LC solution. Kit contains: (3) 15ml bottles of different LC solutions (to raise, lower, or broaden temp. ranges); 3 droppers; (4) 5" sq. Plastic sheets; hoop; artist brush; mixing bottles; booklet; instr. **No. 71,090 $24.25 Ppd.**



Strip Shows Liquid Propane Gas Level

Mylar-sealed liquid crystals accurately measure gas level by color variation. Easy to install on clean tanks (adhesive-backed). No maintenance, moving parts or electrical connections to short. For 20, 30 or 40 lb. tanks, any shape. 18½" long. Pkg. of 4. **No. P-71,506 $9.95 Ppd.**

Chromatic Encapsulated Liquid Crystal Sheet

A 12 x 12" sheet of the new Chromatic Liquid Crystals that give special brilliance and intensity. Crystals are sealed on a Mylar substrate with a pressure-sensitive back and a temperature range of 80-95°F. (± 5°). Sheets can be cut to size and placed in the best position for monitoring color changes in response to temperature variations. Easily mounts on curved and irregular surfaces. **No. 71,794 $3.50 Ppd.**

ASTRONOMY

The Universe Awaits Your Inspection

The many wonders of our universe have always intrigued man. Almost from the time he learned to walk he was enthralled by the mysteries of the sky—the world above him. Yesterday man learned to walk, then to fly; today man has walked on the moon; who knows what adventures tomorrow will bring.

Telescopes have aided us in our search for the answers, have helped us see what is up, and out there—the quiet, awe-inspiring, beauty of The Milky Way, Moon Craters, the amazing yellow-brown ring of Saturn, and many, many more. All are there, waiting for you to "see" and "study." You'll be astonished. And, you'll get a better understanding and insight of the universe.

Hobby? Career? Family Fun?

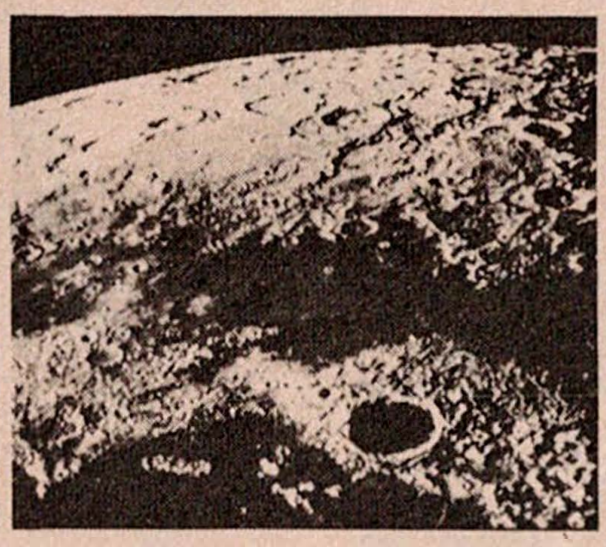
Astronomy is fast becoming a most popular space-age hobby for people of all ages. Many start with inexpensive telescopes and, as their interest and capabilities grow, they buy or build larger and more sophisticated units. Some have converted what initially was a pleasant hobby into a very profitable career; astronomy can be a very rewarding avocation.

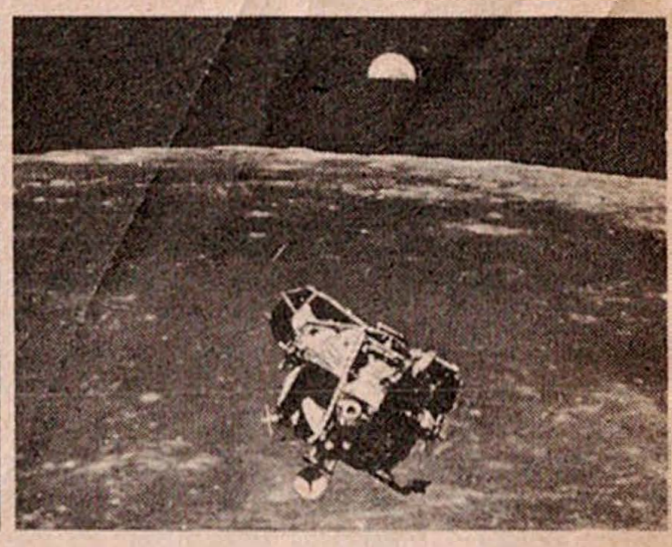
Astronomy is a real adventure for amateurs and professionals alike . . . from observing Apollo's lunar landing areas to charting new discoveries in the far-out reaches of the Universe.

Edmund—Center For All Astronomy Needs

Whether you're a beginner or an expert, want to build a telescope from scratch or buy one complete or in parts, we have everything you need. Reflector, Refractor, Richest-Field telescopes; telescope optics kits; mirror grinding kits; mirrors; mounts; pedestals; tripods; clock drives; finders; tubing; eyepieces; Barlows, books; and items to make your hobby more fun (planetariums, astro murals, maps, star finders, telephotography items).

FUN! EDUCATIONAL! A SPACE-AGE CAREER





Telescope Types

There are two basic types of astronomical telescopes: reflectors and refractors. A reflector uses a mirror; a refractor uses an objective lens. Because of its economy, the reflector type seems to be the most popular choice of beginners.

The Reflector. . . . Objective Mirror Type

In a reflector, light is focused by a concave, front-surface mirror and a diagonal mirror, then "bounced" into the eyepiece tube located near the top end of the telescope tube. Here the image is focused and viewed. The larger the mirror, the more powerful is the telescope. Reflectors cost less and are easier to build than comparable power refractors.

The Refractor. . . . Objective Lens Type

In a refractor, an achromatic objective gathers the rays of light. A primary image is formed at the other end of the tube and magnified by the eyepiece. Refractors cost more than relectors because they require precise color correction and are harder to build. Refractors require less adjustment and are easier to keep clean because their tube ends are closed.

ESSENTIAL TELESCOPE QUALIFICATIONS

Magnification (usually considered by beginners as the most important quality) is actually only one of the desirable functions. Light Gathering Power and Resolving Power are two other very important qualities a telescope must have to give the desired results.

Light Gathering Power

Large objectives (in refractors) and mirrors (in reflectors) are used to increase light gathering power from distant objects. This power increases the apparent brightness of an image.

Resolving Power

Resolution is the ability to show fine detail. In an astronomical telescope resolving power depends on the size and quality of the objective or reflecting mirror. The larger the diameter, the greater its ability to show separately two closely adjacent objects such as double stars. You are also able to see object details better.

"All About Telescopes" By Sam Brown

The best illustrated, most easily understood book about telescopes and astronomy. **No. 9094 $3.00 Ppd.**

Magnification

Theoretically, there is no limit to the amount of magnification you can obtain. In practice, however, magnification beyond about 60X per inch presents drawbacks. They are: 1) Decreased clarity; 2) Decreased image brightness; 3) Decreased field of view; 4) Vibration amplification and difficult observation of stars which are close together.

Telescope experts agree that the top useful power is 50X to 60X per inch of objective aperture, that is, 180X for a 3" telescope, 360X for a 6", etc. No additional detail can be obtained with higher powers. Beyond 50X-60X per inch, everything is amplified including the diffraction patterns, heat waves, dust, clouds and air currents producing fuzzy images.

Magnification higher than 60X is useless and misleading. We attempt to maintain an honest and factual approach to magnification. The listed powers of our telescopes are based on the rule of 60X per inch, not on theoretical and useless power.

Space Conqueror

3″ Reflector 60X To 180X

. . . Only $36.95 Ppd.

OUTSTANDING FEATURES

- 3″ ALUMINIZED MIRROR (BETTER THAN ¼ WAVE)
- 3X FINDER TELESCOPE
- ½″ F.L. EYEPIECE
- BARLOW LENS
- FORK-TYPE EQUATORIAL MOUNT
- LIGHTWEIGHT TUBE
- HARDWOOD TRIPOD
- 1 BOOK, 1 BOOKLET, STAR CHART INSTRUCTIONS

EXCELLENT "FIRST TELESCOPE"

This wonderful telescope is the ideal, low-cost introduction to astronomy and the mysteries of space and the stars. With it you can pursue a fascinating hobby. You can show your children the universe that will play such an important part in their future. Enjoy many hours of educational fun too. See Saturn's rings, Jupiter's moons, Mars, craters of the moon; and the other wonders of the heavens. From a construction standpoint, the Space Conqueror embodies so many features that experienced telescope enthusiasts consider essential for viewing the heavens. You'll have all the magnification power you can use. This telescope is sturdily made, easy to use, and provides years of enjoyment.

3″ DIAMETER MIRROR . . . . . the "Heart of Your Telescope"

The mirror is the most important part of any telescope. As such, you should be certain the mirror is of the finest optical quality. We are proud of our 3″ aluminized, overcoated mirror—better than ¼ wave. With a 31″ focal length, f/10, it provides true viewing quality, easily aligned by means of three tension adjustment screws. Resolving power enables you to see faint stars separated by as little as 3 seconds of arc. As for light gathering power, this quality mirror enables you to see stars to 10½ magnitude.

TUBE MOUNT AND TRIPOD

The tube is strong, spiral-wound Kraftboard with an attractive white covering. The Inside is dull black to prevent glare and reflections.

Fork-type equatorial mount has a 50° polar axis, a feature not found on other telescopes in this price range. It allows an observer to follow a star's movement with only one movement of the telescope . . . easy to keep the star in view. Tripod sturdily constructed of durable hardwood, 36″ high.

Also included, "How To Use Your Telescope" (36 page book); Star Finder; "Star Paths," booklet.

3X FINDER . . . LOCATE STARS QUICKLY

Included is a 3X finder telescope to help you quickly locate stars, planets, etc., for observation.

60X EYEPIECE

You receive a ½″ focal length 60X Ramsden eyepiece which provides more than enough magnification for viewing the wonders of the sky. In addition a Barlow lens which, when used with the 60X eyepiece, brings power to 180X, . . . about maximum effective magnification for telescopes of this size.

No. 85,050 ... $36.95 Ppd.

ACCESSORY EYEPIECES

¼″ F.L. gives 120X with Space Conqueror. 360X with Barlow. **No. 30,195 $5.95 Ppd.**

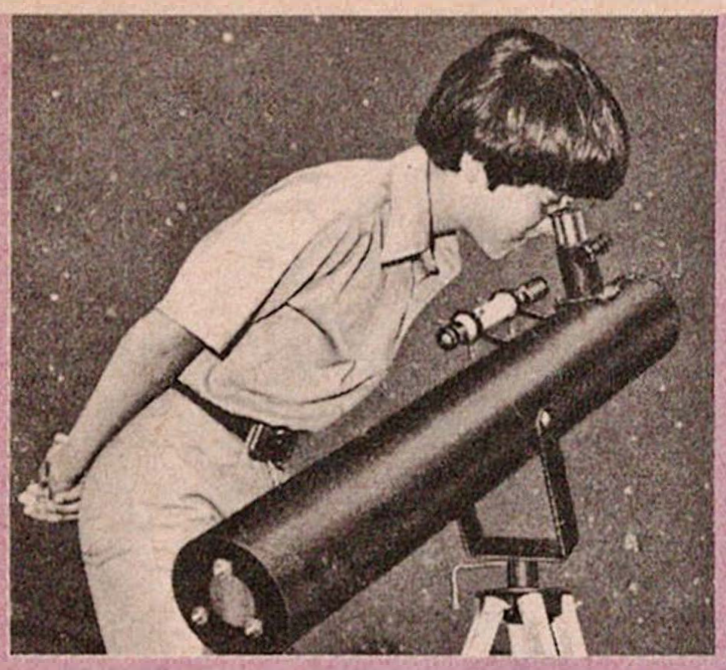
1″ F.L. (31X) Excellent for terrestrial or lunar observation. **No. 30,194 $4.95 Ppd.**

¾″ F.L. (41X) War surplus, mounted, symmetrical eyepiece. Fine for wide field viewing and astro photography. **No. 30,315 $10.95 Ppd.**

Color-Corrected, 2-Element Barlow Lens

Position of lens element can be changed in mount to vary power; doubles or triples power, provides increased eye relief—46.6mm F. L. Brass mount, gloss black outside, dull black inside. Slides in standard 1¼″ I.D. eyepiece focusing tubes, takes 1¼″ standard eyepieces.

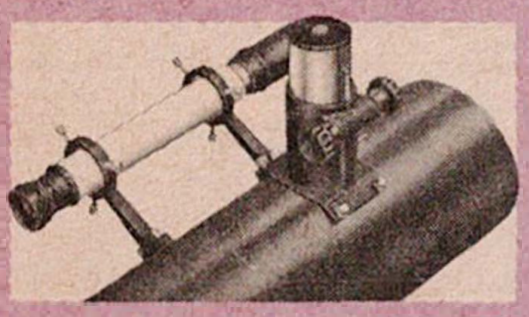
No. 40,477 $9.75 Ppd.



The Apollo Space Explorer

Deluxe 3″ Reflector
60X 120X 180X

. . . Only $66.00 Ppd.



"Deluxe" Way To Enter Astronomy"

An ideal introduction to astronomy, this Apollo Space Explorer is a super deluxe version of our 3″ Space Conqueror & embodies most features experienced telescope enthusiasts desire . . . with better locks, mounts & finder. With this unit you'll have a sturdily made, easy to use telescope with all the magnification power you'll want. Includes features of our Conqueror (pg. 60) . . . PLUS: larger 6X Finder Telescope; rack & pinion focusing; 60X Ramsden eyepiece; 3X adj. Barlow; high impact plastic tube; & hardwood tripod with braces.

3″ Dia. Mirror: Fine optical quality 3″ aluminized, overcoated precision mirror (F.L. 31″, f/10). Fine resolving power to see stars separated by only 3 sec. of arc. Great light gathering power; see stars to 10½ magnitude.

6X Finder Telescope: Top-quality finder has spiral focusing achromatic objective, metal tube, crossline reticle & easily adj. mounts.

60X Eyepiece: Standard 1¼″ O.D. ½″ F.L. 60X Ramsden eyepiece & metal mtd. 3X adj. Barlow (with eyepiece gives 120 & 180X theoretical limit for 3″ dia. mirror).

Rack & Pinion Focusing Mount takes standard 1½″ O.D. eyepieces & accessories, gives smooth focusing.

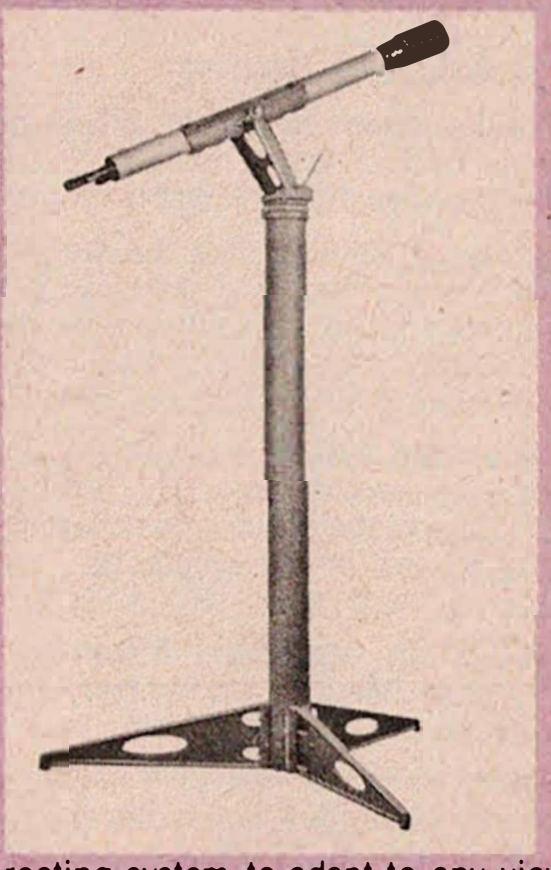
Tube Mount & Tripod. 1/8″ thk. plastic tube with black finish. Dead black inside prevents glare & reflections. Positive locking metal fork mount. Cast iron equatorial tripod head has 40° polar axis: follow a star with only 1 telescope movement, it's easy to keep star in view. Sturdy hardwood tripod, 36″ high, with metal braces.

Also: "How To Use Your Telescope" (36pp); "Star Paths"; Star Finder; & instr. **No. 80,162 $66.00 Ppd.**

Heavy Duty 3 Inch Refracting Telescope

- **Alta-Azimuth Mount**
- **Permanent Base**
- **Great High Powered Terrestrial Viewing**
- **40X-82X Celestial Viewing**
- **The Perfect School Telescope**

These Scopes get our highest recommendation for schools!



In response to numerous requests over the years we are pleased to offer our famous 3-in. refractor telescope on an ultra-duty alta-azimuth mount. This telescope is ideal for school and educational use, due to its durability and excellent optics. Great for permanent mounting on concrete slabs, in school yards, mountain cabins, shore-line homes, or anywhere. The alta-azimuth mount, shifting the telescope longitudinally for balance, or rotating on its axis, can be quickly adjusted by anyone for viewing ease. The entire tube assembly is ruggedly constructed and easily strapped into place for use, or removed when finished, to prevent theft.

The telescope tube, 48″ long, and made of sturdy aluminum with a white enamel finish is pre-drilled to accept our optional finder (#50,121 on pg. 65). Comes equipped with superior optics, 45″ focal length, f/15 aperture, air spaced, low reflection coated, achromatic objective. Smooth, all metal rack and pinion eyepiece holder for all American standard 1¼″ dia. eyepieces. For exceptional terrestial and major celestial observations we have supplied the telescope with 28mm wide angle and 12.5mm Kellner eyepieces for powers of 40 & 82X. Also incl. are a prism star diagonal system & a prism erecting system to adapt to any viewing requirement. Tube itself is well supported in heavy cast iron cradle. Resolving power 1.5 sec. of arc.

3″ Heavy Duty Alta-Azimuth Refracting Telescope With Portable Mount—incl. Telescope, mount, threaded pipe pedestal with 3 cast iron legs. Shpg. Wt. 150 lb. **No. 85,217 $305.00 T.C.C.**

3″ Heavy Duty Alta-Azimuth Refracting Telescope With Pedestal Base—as above except legs replaced by heavy bolt-down base. Entire mount & scope still remove. Shpg. wt. 125 lb. **No. 85,218 $332.50 T.C.C.**

Individual Parts

Heavy Duty Post—4″ dia. x 5-ft. pipe; attaches scope to base. Sh. wt. 50 lb. **No. 85,219 $49.95 T.C.C.**

Alta-Azimuth Mount for Refractor Scopes—heavy duty mount; adapts to any quality rugged scope. Removable for storage. Sh. wt. 20 lb. **No. 85,220 $93.00 T.C.C.**

Cast Iron Pedestal Legs—Convert permanent type to semi-portable. Sh. wt. 35 lb. **No. 85,221 $45.95 T.C.C.**

Clamp Base For Telescope Mounting—heavy split bolt-on flange mount for permanent installation of post on your concrete slab. Use with any standard 4 in. dia. pipe (#85,219). Wt. 40 lb. **No. 85,222 $70.00 Ppd.**

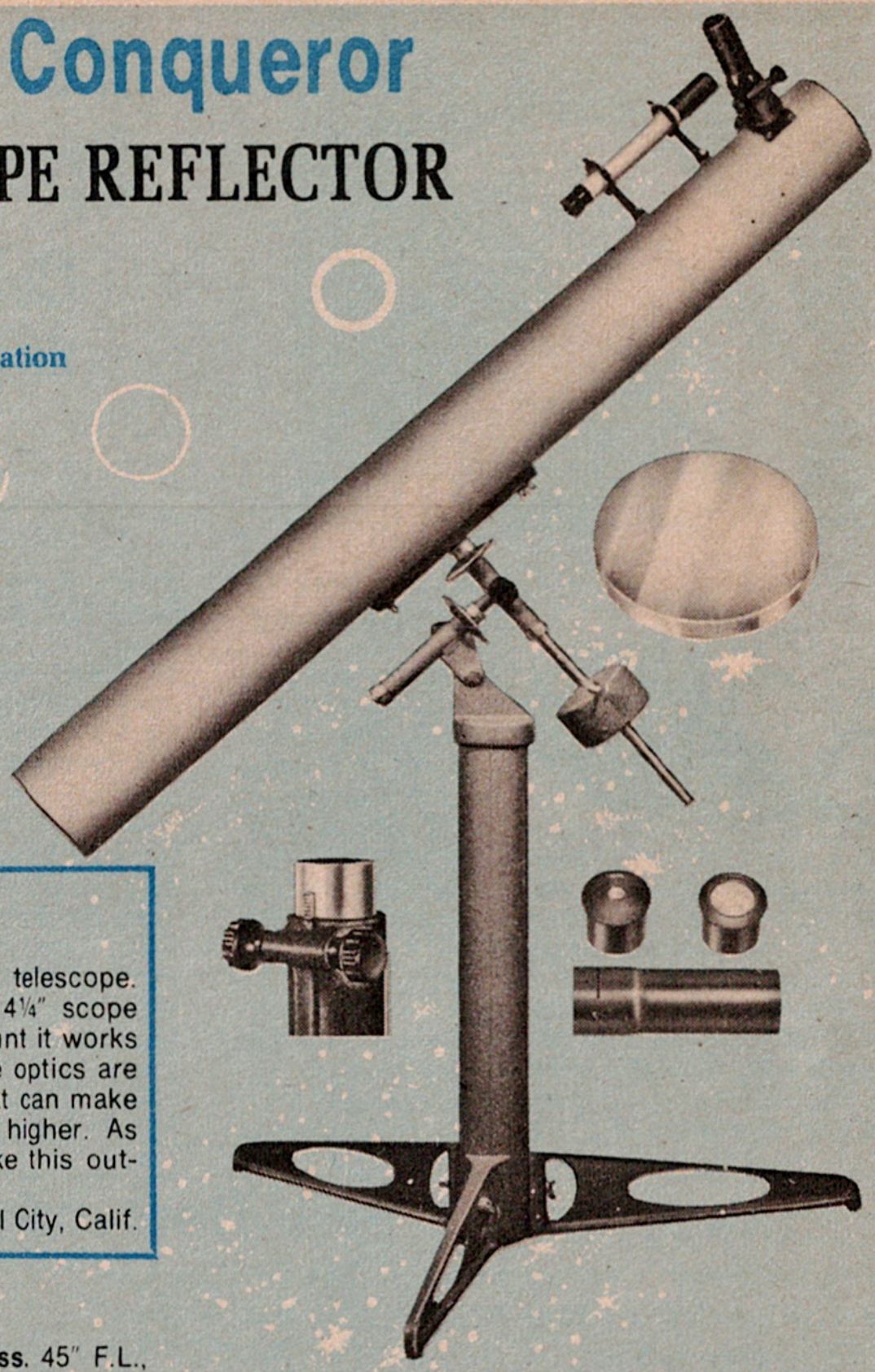
Deluxe Space Conqueror

4¼" PALOMAR-TYPE REFLECTOR

45X To 270X

Only $115.00 Transportation Charges Collect

- 4¼" Spherical Mirror (Better than ¼ wave)
- 6X Finder Telescope
- Two 1¼" Eyepieces
- Rack & Pinion Focusing
- Mounted Barlow Lens
- 46" Aluminum Tube Beautiful White Finish
- True Equatorial Mount
- 3" Setting Circles
- Counter Balance
- 24" Metal Pedestal
- Helpful Booklets



Here's What Our Customers Say!

"Dear Mr. Edmund:
I'm writing regarding your 4¼" reflecting telescope. I've used a 6" one at college and your 4¼" scope made the 6" one look sick. As for the mount it works as well as a much higher priced one. The optics are excellent! I've found no other company that can make such a telescope at this price or much higher. As long as you keep manufacturing items like this outstanding one, I'll always be a customer."

C. P., National City, Calif.

Many Outstanding Features

4¼" Spherical Mirror of Pyrex® Sheet Glass. 45" F.L., f/10. Better than ¼ wave, resolves to theoretical limit. Aluminized, overcoated, adjustable mount.

True Equatorial Mount. Track the moon, sun and stars with only 1 movement. Adjusts to your latitude. Polar angle adjusts from 0° (Equator) to as far North as the North Pole (90°). Counter-balanced, two 3" setting circles, ultra-smooth movement, and locking knobs

2 Eyepieces and Barlow. You get a 1" F.L., 45X Kellner achromatic eyepiece and a ½" F.L., 90X eyepiece, plus a mounted achromatic Barlow lens which doubles and triples the powers of the eyepieces. This gives you all the power you need; 135X, 180X & 270X.

46" Lightweight Aluminum Tube provides a rigid mounting base. Beautiful white finish. Predrilled to take camera holder (No. 70,162, pg. 68).

6X Finder Telescope has achromatic objective with light shade, Ramsden eyepiece in spiral focusing mount, crosshair reticle, adjustable mount.

Pedestal Base. A sturdy, 24" high support of heavy-gage steel tubing. Reduces wobble and vibration.

FREE BONUS. "How To Use Your Telescope" (36 pp.), Star Finder and "Star Paths".

No. 85,105 $115.00

Shpg. wt. 42 lbs. **Trans. Chgs. Coll.**

Deluxe Space Conqueror With Clock Drive

Shpg. wt. 45 lbs.

No. 85,107 $149.95 T.C.C.

Compare with Any Other Make

The ideal telescope for quality-minded beginners and serious amateurs who want expensive, professional telescope features at a bargain price. It has more than double the light gathering capacity of 3" types. Schools across the U.S.A. buy it for space-age educational programs. American-made, it gives all the power that can be used effectively in a 4¼" scope. It's so powerful you can read a newspaper headline 1 mile away! You'll see the moon's craters and seas, Saturn's rings, double stars, Jupiter's moons, etc. And it's easily portable . . . takes only a few minutes to mount.

4¼" Telescope Without Mount & Pedestal

No. 85,105 without equatorial mount, cap, pedestal. Assembled. Shpg. wt. 10 lbs. **No. 85,113 $83.50 T.C.C.**

Want 540X? ¼" F.L. eyepiece gives 180X & 540X when used with Barlow supplied with telescope.

No. 30,204 $6.50 Ppd.

Telescope Image Erector

No. 50,276 $18.00 Ppd.

19mm F.L. Symmetrical Eyepiece

64X . . . makes it perfect for viewing planets. Standard, 1¼" dia. alum. mount. 2 coated achromats; 16mm clear dia. **No. 30,316 $9.95 Ppd.**

Super Space Conqueror

6″ Reflector American Made . . .

Has Complete Line of Accessories

48X to 360X

$259.50 **Transportation Charges Collect**

NO EXTRAS TO BUY . . .
HAS ELECTRIC CLOCK DRIVE

EDUCATOR ACCEPTED! The Super Space Conqueror is ordered by many, many schools across the country. Completely accepted for purchase under NDEA.

A superb instrument. It includes electric clock drive, setting circles, heavy-duty equatorial mount and a pedestal base. It fills the demands that most serious amateurs and schools place on a telescope. Clearly and sharply shows you the Rings of Saturn, Jupiter's Moons, Mars, Craters of the Moon, and all the wonders of the sky. It will reveal stars of nearly 13th magnitude and split double stars separated by less than 1 second of arc. Its optical quality and stability have brought us many compliments. Compare it with telescopes costing $325 to $375. The Super Space Conqueror is one of the few telescopes priced to save you money without sacrificing quality. It will give you many years of pleasure.

Parabolic Mirror. This fine mirror made from PYREX® brand sheet glass, is hand-finished to better than ¼ wave, corrected to the theoretical limit of resolution, aluminized, and overcoated. Focal length 48″, speed f/8.

6-Power Achromatic Finder Scope with crosshairs; adjustable mount.

Three Standard 1¼″ Eyepieces and Achromatic Barlow. We include a wide-field achromatic 48X Kellner, a ½″, 96X and a ¼″, 192X Ramsden and a Barlow that will double and triple each of these magnifications giving you up to 576X. Eyepieces are positioned in a rack and pinion focussing mount.

Sturdy 47¾″ Long Aluminum Tube. Attractive finish of durable, baked white enamel. Interior is painted flat black. Predrilled to take camera holder (No. 70,162, pg. 68).

Heavy-Duty True Equatorial Mount. Teflon bearings; counter-balanced; two 3″ setting circles. Polar angle adjusts from Equator (0°) to as far north as Fairbanks, Alaska (66°). Locks securely.

Electric Clock Drive. Has quick clutch with lock for balance, smooth operation, long life. **Manual Slow Motion Control** . . . lever-operated cam adjusts drive permits precise star-tracking. **Full details, see page 67.**

Rigid, All-Metal Pedestal Base is vibration and wobble-free. 24″ high.

Included Free. "Star and Satellite Finder," "How to Use Your Telescope", complete instructions.

No. 85,086 $259.50 **Trans. Chgs. Coll. (Shpg. Wt. 68 lbs.)**

Same as No. 85,086 but without clock drive.

No. 85,187 $222.50 **Trans. Chgs. Coll. (Shpg. Wt. 65**

Telescope only (no mount, drive, circles or base). Shpg. wt. 18 lbs. **No. 85,114 $188.00 Trans. Chgs. Coll.**

Tripod & Mount (As supplied with telescope above.) Shpg. wt. 38 lbs. H.D. 32″. **No. 85,023 $49.50 T.C.C.**

Useful Accessories

Telescope Image Erector **No. 50,276 $18.00 Ppd.**

Camera Holder & Sun Screen. Helps you take great photographs. **No. 70,162 $12.50 Ppd.**

Slow Motion Control Kit for Declination Axis. Holds star within any 4-5° declination. Fits 6″ Reflector, No. 85,086. **No. 60,574 $19.50 Ppd.**

The 8″ Reflector

OUR LARGEST AND BEST

Designed For Serious Amateurs, Colleges, Schools

64X 480X And Higher

$560.00 Transportation Charges Collect

Outstanding Features

- Electric Clock Drive
- Quality annealed parabolic mirror made of Pyrex® Sheet glass. f/8, 64″ F.L. Hand-corrected to better than ¼ wave.
- Three standard 1¼″ matched orthoscopic eyepieces.
- Deluxe wide-field 6X finder telescope.
- Extra-Heavy-Duty equatorial mount with Teflon bearings.
- Setting Circles

Top Value 8″ Reflector Gathers Twice The Light Of A 6″ Reflector . . . incl. Electric Clock Drive

This 8″ reflector telescope is designed to meet the most exacting requirements of the serious amateur, for use in high school and college astronomy courses, and for the most ambitious studies of galaxies, star clusters, nebula, etc. This telescope offers nearly twice the light gathering power of a 6″ scope and has a resolving power of .6 seconds of arc. The top quality parabolic mirror is 8″ dia. hand corrected to better than ¼ wave. It is aluminized and overcoated. Included is a matched set of 4 element, orthoscopic eyepieces (6mm, 12.5mm, and 25mm) precision made and fluoride coated; an achromatic mounted Barlow lens; specially designed electric clock drive; a heavy-duty equatorial mount (No. 85,172 described below) designed to minimize vibration; a deluxe wide-field 6X finder scope, setting circles; 63″ long phenolic bonded tube; 2 booklets; Star Chart, and instructions. Here indeed is a reflecting telescope that will give many years of service. Shpg. wt. 210 lbs.

No. 85,171 $560.00 Trans. Chgs. Coll.

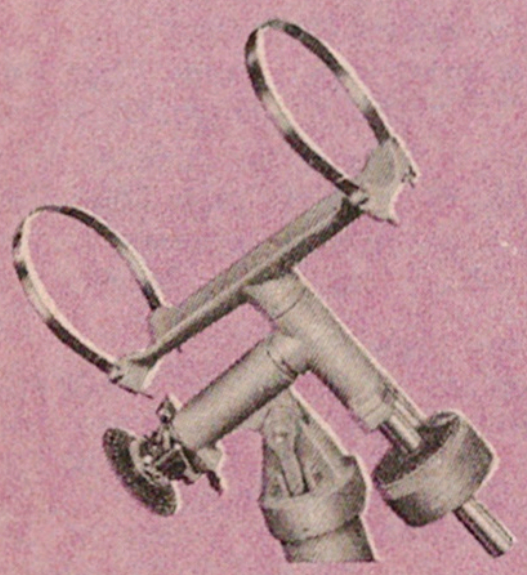
Telescope, pedestal & mount with setting circles (no clock drive). Shpg. wt. 206 lbs.

No. 85,143 $505.00 Trans. Chgs. Coll.

Telescope only (no mount, drive, circles or base). Shpg. wt. 28 lbs. **No. 85,144 $321.50 Trans. Chgs. Coll.**

Rugged Pedestal Base Only Cast iron post (4″ I.D.) with three 2-ft. long feet; 30″ high. Cap not incl. Wt. 83 lbs. **No. 85,145 $64.50 Trans. Chgs. Coll.**

Extra-Heavy-Duty Equatorial Mount For Large Telescopes



Has clock drive and setting circles designed for 8″ telescopes. Clock drive is similar to one described on page 67 except more sturdily mounted. Setting circles are big 5¾″ dia. Hour circle driven by clock for more accurate tracking. Not a souped-up 6″ mount, but one specifically tailored to handle massive 8-inchers. It fits any 6″ and even holds 10″ reflectors satisfactorily. Takes refractors up to and including the big 5″ ones. Mount has 1½″ dia. polar and declination shafts with 1″ O.D. tip on polar shaft for mounting clock drive. Mount made of cast iron for greater rigidity. Weighs 75 lbs. including counterweights. Large Teflon bearings reduce friction and permit exact balancing. Specially designed fine adjustment for latitude setting; adjustment of polar angle from 0° at Equator to as far north as Devon Island Canada (76°); positive shaft clamping. Mounts on standard 4″ pipe. Important: give tube diameter of telescope when ordering. Shpg. wt. 100 lbs.

No. 85,172 $221.50 Trans. Chgs. Coll.

Mount with setting circles only (no clock drive). Shpg. wt. 95 lbs.

No. 85,134 $161.50 T.C.C.

Celestron® Schmidt-Cassegrain Telescopes

The Optimum Instruments For General Observing; Astronomy; Astrophotography; Telephotography!

These Celestron® Telescopes are super lightweight, portable, compact! Their short, stubby tubes are more stable at high power than most observatory telescopes many times the size. Each is a complete observatory, includes a fork mount with electric clock drive, is diffraction limited, folds compactly, has attractive, velvetone finish; 2 synchronous timing motors (assure stable, jitter-free performance; 110v, 6w); vernier slow motion controls in both axes (for easy, accurate pointing); 2 large calibrated setting circles; handy carrying case. Optical accessories incl: finder telescope, prism type star diagonal (convert to our Amici type with No. 50,247 on page 66); 2 eyepieces.

Swings down to compact portable unit.

CELESTRON® 5

The 5" clear aperture of this moderate priced model's compound catadioptric 1270mm lens system makes objects appear 188 times brighter than the unaided eye. Tip it on wedge assembly (available separately below) and have finest 5" astronomical telescope. Primary F.L. 10", Cassegrain F.L. 50" f/10. Incl: two 24.5mm barrel dia. eyepieces, (12.5mm gives 100 power and 25mm gives 50X); fork mount. Overall size 7 x 8 x 16", wt. (incl. mount & drive) 12 lb. Shpg. wt. 15 lb.

No. 85,212 $625.00 T.C.C.

Wedge Assembly For Celestron® 5

Table-top cast aluminum wedge adjustable from 20-50° to tilt the Celestron® 5 up to desired latitude angle. Lightweight, only 4-lbs. for easy portability.

No. 71,797 $41.25 Ppd.

CELESTRON® 8

The most luxurious model . . . the sharpest 2000mm telephoto lens obtainable. Its stubby tube swings down so overall size is a compact 9 x 12 x 24". The 8" clear aperture makes objects appear over 500 times brighter. The ½-second resolution allows diffraction limited performance of 50 & 80X (eyepieces for higher power listed on page 70). Wt. 23-lb. incl: Two standard 1¼" eyepieces, (25mm gives 80X and 40mm gives 50X). For crisp daytime terrestrial viewing or telephotography it may be used as an alta-azimuth. It requires our No. 71,528 cast alum. adjustable wedge accessory (not incl.). Shpg. wt. 50 lb.

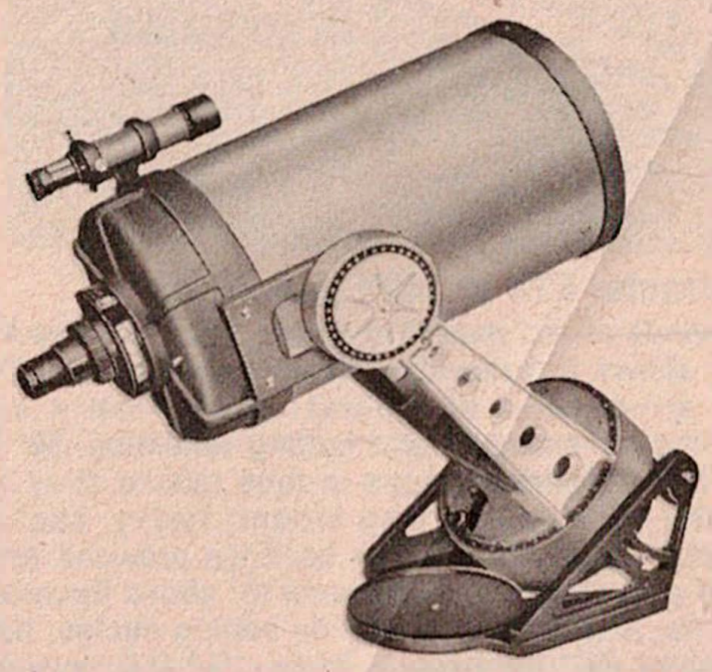
No. 85,200 $895.00 T.C.C.

Wedge Assembly For No. 85,200 Celestron® 8

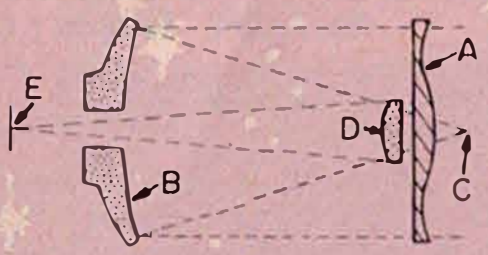
Cast aluminum adjustable wedge from 20-50° for celestial viewing with Celestron® 8; permits simple adjustments for specific altitudes. Necessary for table top uses. Wt. 4.7 lb..

No. 71,528 $50.00 Ppd.

Tripod for Celestron® 5 & 8 (requires appropriate wedge). Shpg. wt. 25 lb. **No. 85,226 $150.00 T.C.C.**
Get other accessories on special order from our Sales Engineering Department.



The Schmidt-Cassegrain Optical System is capable of sharper images over a wider flat field than any other compound reflective optical system. There is no other telescope with this optical configuration comparable to the Celestron® Telescopes.



Optical diagram of Celestron Schmidt-Cassegrain lens system: Light enters system through thin aspheric corrector lens (a); is reflected by a large spherical primary mirror (b) toward the prime focus (c). Light from primary is intercepted by convex secondary mirror (d) and reflected back through hole in primary mirror to Cassegrain focus (e). The effect of folding the optical path back with convex secondary mirror increases effective F. L. by a factor 5 times that of primary alone.

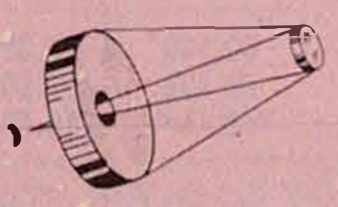
Features	Celestron® 5	Celestron® 8
Light Grasp (Unaided Eye)	188	510
Resolution	0.8 arc. sec.	0.5 arc. sec.
Cassegrain Eff. F.L.	1250mm. 50"	2000mm. 80"
Near Focus	15 ft.	25-ft.
Useful Magnification	31-250X	50-400X
Finder Scope	5X-24mm	6X-30mm
Eyepieces Incl.	25mm-50power 12½mm-100power	40mm-50power 25mm-80power
Setting Circle Dia.		
Rt. Ascention	6½"	8"
Declination	4"	4"
Secondary Dia.	2"	2¾"
Weight	12 lb.	23 lb.
Price (T.C.C.)	**$625.00**	**$895.00**
Model No.	**85,212**	**85,200**
Wedge Incl.?	No	No

4¼" Maksutov Optics Set

Make a compact 16" f/23 telescope with an effective 92" F.L. 4.45" dia. correcting lens of highest quality optical glass. Primary Pyrex® brand glass mirror perforated with 1.062" dia. hole. Long F.L. allows high powers without use of short F.L. eyepieces. This Gregory-Maksutov System is guaranteed to resolve to Dawes limit and meet Raleigh criteria for focal shift. Instr.

No. 1627 $295.00 Ppd.

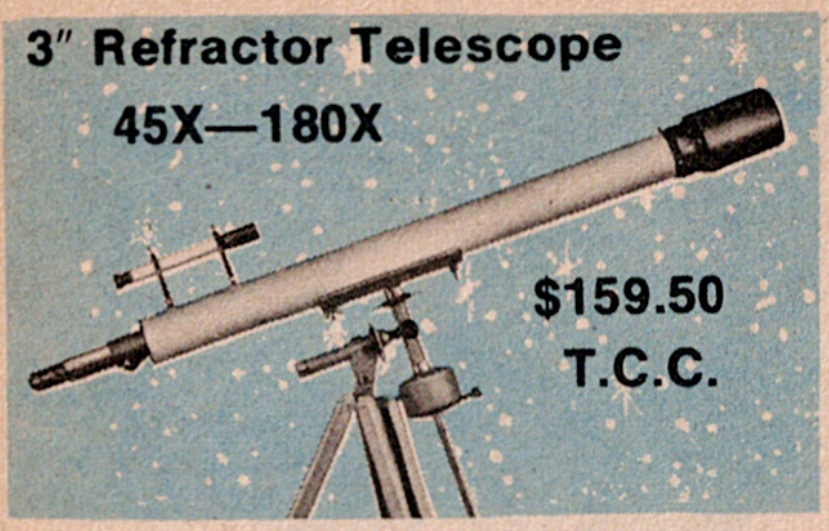
4¼" Dall-Kirkham Cassegrainian System



Make a portable, powerful 60" F.L. telescope (f/15) with a tube only 15" long! Completely finished, 1/8 wave, 4¼" dia., ellipsoidal primary mirror of Pyrex® brand sheet glass (perforated with 1.062" dia. hole); 1¼" dia. spherical secondary mirror; instr.

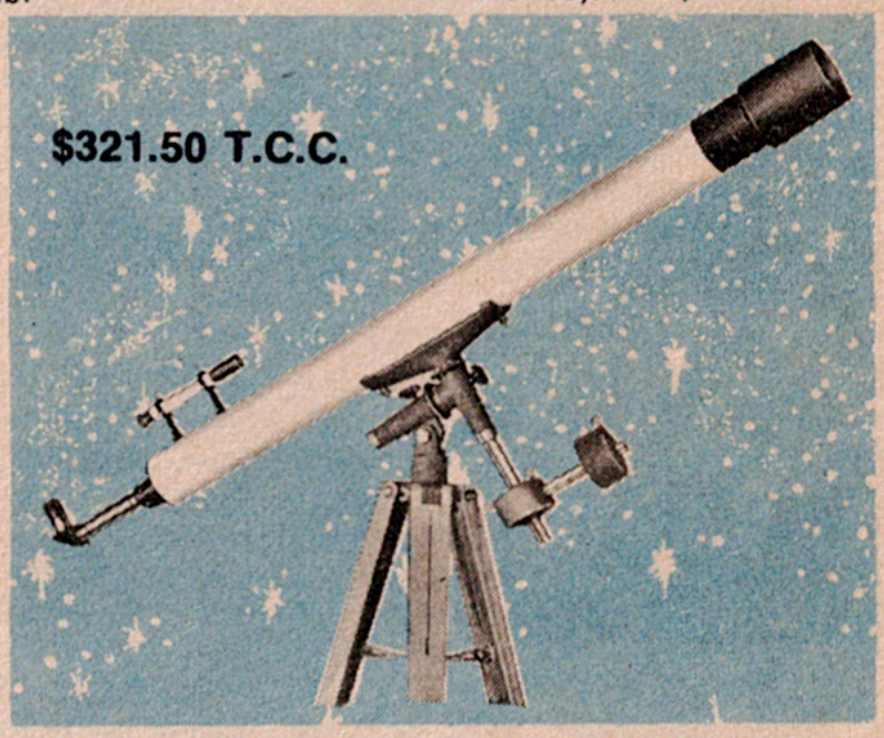
No. 71,306 $156.00 Ppd.

3″ Refractor Telescope



Resolving power 1.5 secs. of arc. Few imported parts, largely American made to precise specs. 3″ air-spaced achromatic objectives. Low-reflection coatings on 4 surfaces, 45″F.L., f/15. 1¼″ eyepieces: (½″F.L. 90X; 1″F.L. 45X; mounted Barlow). Latter doubles or triples powers of others, gives 135, 180, 270X. Metal eyepiece holder has smooth rack & pinion focusing adjustment. Equatorial mount w/counterbalance. Polar axis adjustment equator (0°) North to Fairbanks, Alaska (66°). Easily adjusted for terrestrial viewing. Easily read, precision setting circles, 6X finder telescope (with crossline reticle) in double-ring mount & prism star diagonal. 60″ hardwood tripod; white enameled alum. tube; approx. 40″ overall length; incl. booklet, Star Chart. Shpg. wt. 30-lb. **No. 85,032 $159.50 T.C.C.**

4″ Refractor 60X to 240X and Higher



1.1 seconds of arc resolving power. This massive 4″ refractor allows unbelievably steady viewing. Has 2-element, air-spaced achromat, coated on 4 sides increasing transmission and cutting reflection. 60″ F.L., f/15. Fixed diaphragm stops in tube reduce stray light. 6X finder with double ring mount; heavy, cast-iron equatorial mount with Teflon bearings provides adjustment of polar angle from Panama (8° above Equator) to Fairbanks, Alaska (66°); precision setting circles; heavy-duty tripod (60″ hardwood); three 1¼″ O.D. eyepieces (provide 60, 120, 240X); mounted Barlow doubles and triples power of eyepieces; eyepiece extension; eyepiece holder with rack & pinion focusing (4-5/8″ travel); star diagonal, star chart. White, enameled, alum. tube. Wt. 42 lbs., shpg. wt. 58 lb. **No. 85,038 $321.50 T.C.C.**

As above but with Electric Clock Drive. Shpg. Wt. 60 lbs. **No. 85,087 $362.00 T.C.C.**

REFRACTOR TELESCOPE ACCESSORIES

(A) Eyepiece Mounts

Have smooth rack-and-pinion focusing with variable tension adjustment. Take standard 1¼ dia. eyepieces and accessories. Black, wrinkle-finished aluminum body; chrome-plated rack and focusing tube with 4-5/8″ excursion (view close or distant stars, etc.); 1¼″ clear aperture.

No. 50,103	For tubes 2-7/8 I.D.	**$15.95 Ppd.**
No. 50,108	For tubes 3-7/8 I.D.	**$17.95 Ppd.**

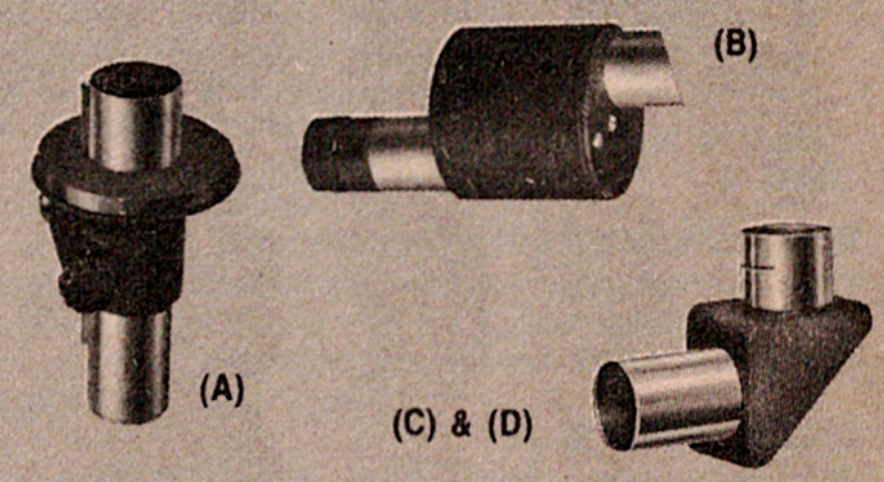
(B) Telescope Prism Erecting System

Porro-prism system, similar to binocular erecting system gives erect image viewing. Fits all refractor telescopes with standard 1¼″ O.D. eyepieces. Optical length of system 8″. Clear aperture 1¼″.

No. 70,078 $20.50 Ppd.

(C) Prism Star Diagonal . . . View High Sky Objects

For refractor telescopes that use standard 1¼″ O.D. eyepieces . . . can be adapted to sub-standard refractors.



Useful for right angle viewing on optical instruments. Contains right angle prism, chromeplated tubes, black wrinkle finish aluminum body. 1″ clear aperture. Optical path 3-5/8″. **No. 70,077 $15.25 Ppd.**

(D) Amici Prism Erecting System

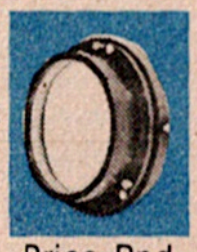
Right angle viewing with exact image that's correct right-to-left. Takes standard 1¼″ O.D. eyepieces.

No. 50,247 $17.95 Ppd.

High-Quality, Low-Cost Refractor Objectives

Building a refractor usually costs more than comparable-power reflectors. These high-quality parts at bargain prices help you cut initial costs.

Achromatic Objective Lenses



Imported; air-spaced, low-reflection coated on all 4 surfaces, mounted in sturdy, black metal cell with threaded retaining rings. Lenses precision ground, color corrected, free of coma & spherical aberrations.

Diameter	F.L.	O.D.	I.D.	No.	Price, Ppd.
3″	45″	3-1/8″	3″	**50,162**	**$ 76.00**
4″	60″	4-1/8″	4″	**70,128**	**159.50**
5″	71″	*	5″	***70,164**	**269.50**

* Mounted in cell with 5½″ O.D., 6½″ flange. With adapter for mounting in 6-7/8″ I.D. tubing.

Unmounted, Air-Spaced, Achromatic Objectives

Diameter	Focal Length	Stock No.	Price, Ppd.
3″	45″	**30,190**	**$ 65.00**
4″	60″	**50,107**	**109.50**
5″	71″	**70,163**	**219.50**

Precision Quality Cemented Achromats . . . 52mm dia.

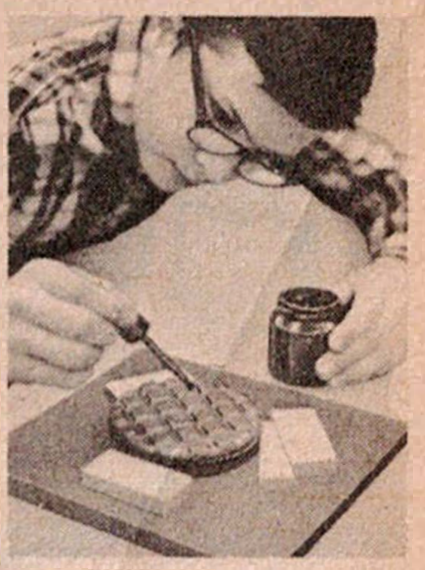
Use in building telescopes, collimators, erector systems . . . wherever a medium to long focus, entered, coated, color corrected lens is necessary. **$13.70 Ppd. ea.**

254mm F.L.	**No. 41,267**	**762mm F.L.**	**No. 41,270**
381mm F.L.	**No. 41,268**	**1016mm F.L.**	**No. 41,271**

Low-Cost 50″ F.L. Achromatic Lens

Gives 100X, using a ½″ F.L. eyepiece. 2″ dia., low-reflection coated, air-spaced. **No. 30,187 $13.50 Ppd.**

MAKING YOUR OWN TELESCOPE

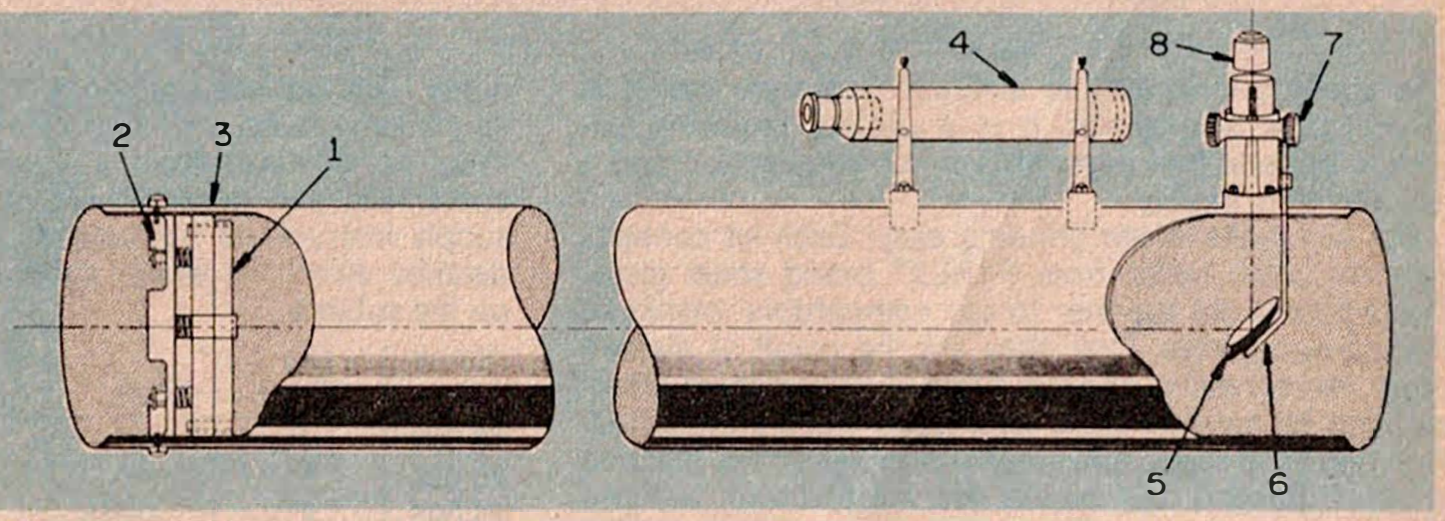


It's quite practical to make your own reflector telescope either by using already finished parts or by grinding and polishing your own mirror. With reasonable care, you can make one as good as many commercial telescopes. For instance, a good refractor with a 4¼" objective lens costs about $265.00. You can buy all the optical parts to make a 4¼" reflector telescope for about $30.00. Tubes and metal parts can be bought or made depending on your time and ability.

THOUSANDS HAVE FOUND IT EASY

The number of amateur telescope makers has been steadily growing in the U.S.A. Many telescopes have been built by people with no previous experience. Building your own telescope is fun and economical too. You can get started today by browsing through this catalog and choosing the kit or parts you need.

Guide for Building Your Own Reflector Telescope



1. Objective Mirror

This is the heart of your reflector telescope, so you will want to choose it carefully. Determine diameter of mirror you want (3, 4¼, 6" etc.) Most amateurs make a 6" diameter mirror, a few start with an 8". For mirror grinding kits & blanks, see page 68; finished mirrors & optical kits, see page 69.

2. Mirror Mount

Should be a rigid support, yet easily adjustable. You can make your own of wood or metal, or purchase one from our fine selection listed on page 69.

3. Telescope Tube

It can be of cardboard, wood, aluminum, etc. It should be painted black or "flocked" on inside to cut bounced light to a minimum, and should have inside diameter larger than your mirror. For example:

Mirror Size	Tubing Inside Dia.	Mirror Size	Tubing Inside Dia.
3"	3-7/16"	6"	6-7/8"
4¼"	4-7/8"	8"	9"

See our fine selection of tubing on page 72.

4. Finder Telescope

Use a 3X to 8X finder to locate the object to be observed with your high-powered telescope. We have many fine-quality, inexpensive, war surplus lenses to make one. Or, you can buy one complete. See page 73.

5. Diagonal Mirror or Prism

Directs image light rays from objective mirror into the eyepiece. It should be optically flat, aluminized, and overcoated. Here, as with the objective mirror, the better ones are polished to 1/4 or 1/8 wave accuracy. They are easier to buy than make. See page 69.

6. Diagonal Mirror or Prism Holder

We have inexpensive holders and a fine quality, adjustable holder adaptable to 5" to 9" I.D. tubes. See page 69.

7. Eyepiece Focusing Holder

This may be a simple sliding type or a rack and pinion focusing mount. See page 71.

8. Eyepieces . . . They Magnify The Image

Usually eyepieces consist of two or more mounted lenses. A holder (draw tube or rack & pinion) focuses the eyepiece on the image. Quality is determined by design (Orthoscopic, Kellner, etc.), focal length (28mm, 19mm, etc.), and apparent field of view (50°, 40°, etc.). See pages 70-72 for our fine selection.

9. Tripod and Mount (Not Illustrated)

You can make either or both of these. We list tripods and a wide selection of mounts (equatorial . . . simple or complete), pages 74-75.

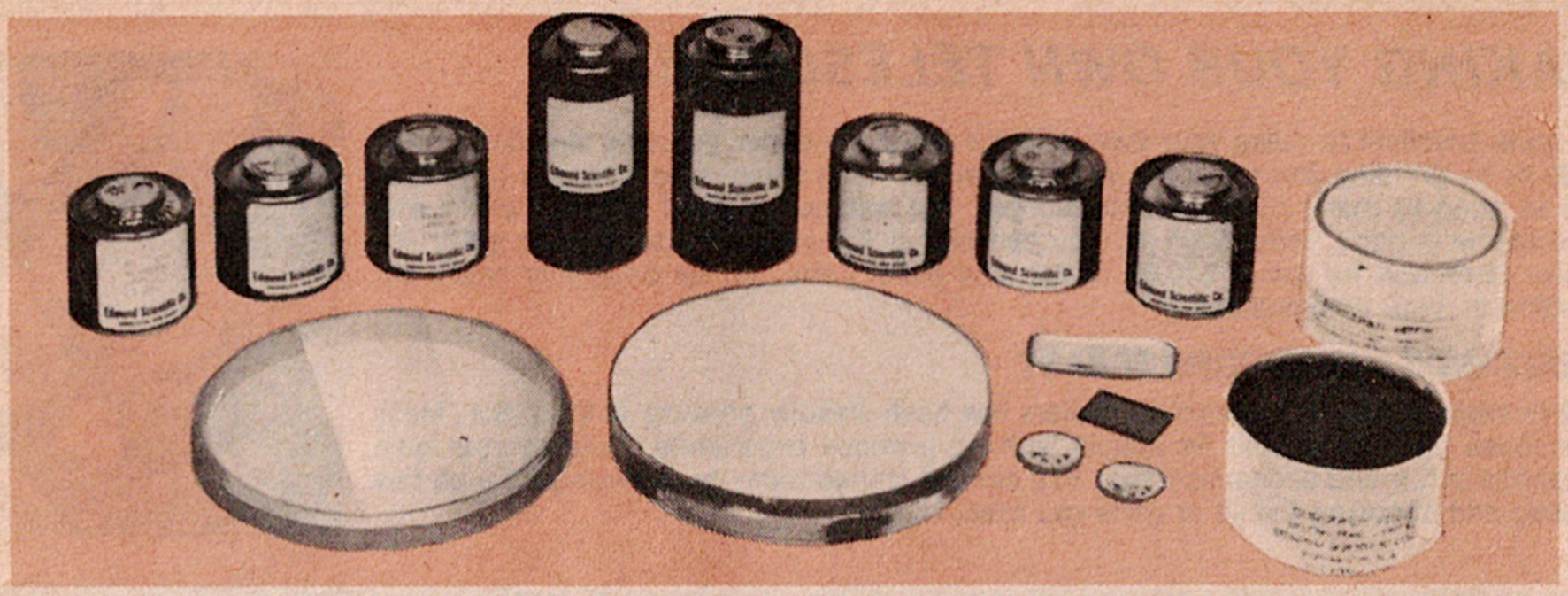
10. Instruction Books

Four of the best are by Thompson, Texereau, Ingalls, and Brown. You'll find them on page 77.

Suggested Parts Lists

PART	8" Reflector	6" Reflector	4¼" Reflector	3" Reflector
Finished Mirror or Kit	85,069 or 70,005	5002; 71,026 or 70,004	50,051 or 70,003	50,082
Mirror Mount	70,072	50,117	50,079	50,109
Tube (not drilled or painted)	83,139 or 85,146	85,008 or 85,014	85,013 or 80,038	80,056
Finder Telescope	70,175	50,080 or 50,121	50,121	60,363
Diagonal Mirror	30,258 or 30,261	30,188; 30,205 or 30,258	30,260 or 60,086	30,259 or 60,087
Diagonal Holder	50,025	50,025 or 60,049	60,035	60,035
Eyepiece Holder	50,077	50,077 or 60,067	50,077 or 60,067	60,067
Mount & Pedestal	85,134 & 85,145	85,111 or 85,108	85,112 or 85,109	N. A.

Choose your eyepieces and accessories from our wide selection listed on the following pages.
"Edmund has the Accessories to Improve Your Present Telescope Too."



Complete Mirror Grinding And Polishing Kits . . . Include Blank, Tool And Abrasives

The ultimate thrill for the amateur telescope maker is grinding his own mirror. It is a project requiring patience, but one that pays off in much satisfaction and a real saving in money.

Our kits make mirror grinding easy! Each kit contains a mirror blank recast from PYREX® brand sheet glass. These blanks are superior to our competitors' blanks in the following ways: First, they are the result of melting down and recasting original PYREX® brand sheet glass, and can be considered to have been **double annealed.** This results in fewer and smaller bubbles in the finished product. Second, our blanks are molded with uniform thickness, square edges (no taper), and two flat, parallel faces. This lets you (1) choose from either side for grinding and (2) turn the blank over if you ruin the first side. In addition to quality blanks, our kits contain: plate glass tool used to grind the mirror; 2 lenses which only require mounting to give excellent, 1" F. L. eyepiece; first-surface, rectangular, mirror diagonal for alignment and set up; magnifying lens for inspection; 8 assorted abrasives from coarse to fine in shaker-top containers, and tempered Burgundy pitch. We do not supply instructions because successful results require detailed directions which can be found only in books on the subject.

Stock No.	Dia. Mirror	Thick.	Shpg. Wt.	Kit Price
70,003	4¼"	¾"		**$12.50** Ppd.
70,004	6"	1"		**19.50** Ppd.
70,005	8"	1-3/8"		**28.25** Ppd.
70,006	10"	1¾"	30 lbs.	**53.25** *T.C.C.
70,007	12½"	2-1/8"	46 lbs.	**89.50** *T.C.C.

*Transportation Charges Collect

See "Homebuilt Telescopes," Page 77 . . . best book yet on mirror grinding for the amateur.

Mirror Blanks of Pyrex® Brand #7740 Sheet Glass

Dia.	No.	Price	Thick
3"	**41,664**	**$2.50**	3/8"
4¼"	**80,016**	**4.45**	¾"
6"	**80,017**	**7.95**	1"
8"	**80,009**	**13.25**	1-3/8"
10"	**80,000**	**29.50**	1¾"

Plate Glass Grinding Tools

No.	Price	Thick
40,037	**$1.45**	3/8"
80,011	**2.50**	5/8"
80,012	**4.50**	5/8"
80,013	**7.75**	¾"
80,014	**20.25**	7/8"

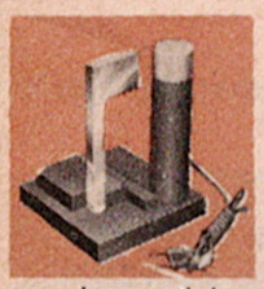
Items above shipped postpaid. The 3" and 4¼" tools can be used as mirror blanks if desired. Items below shipped Railway Express, Transportation Charges Coll.

12½" **80,010 $47.00** Shpg. wt. 21 lbs.

2-1/8" **80,015 $27.25** Shpg. wt. 14 lbs.

1-1/8"

Tempered Burgundy Pitch. For making "pitch lap". A real trouble saver because no rosin or beeswax need be added. ½-lb. container. **No. 40,023 Only $1.50 Ppd.**



Foucault Tester Kit

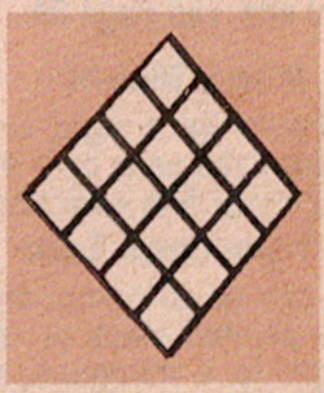
Easily assemble your own Foucault knife-edge tester with this inexpensive kit. When completed, use to test spherical mirrors, for parabolizing mirrors, checking effects of different mirror-polishing strokes, etc. We use one in our laboratory. Kit has every part you need: 7.5w bulb and socket, knife-edge, wire, cord & plug, slide, 5 x 5" wooden base, 6" column, cap, spacer, hardware, complete instr. **No. 70,977 $7.75 Ppd.**

Edmund's 11 x 17" Universal Star Maps

Set of 8 includes 2 Circum Polar maps of North & South Hemispheres (50-90° latitude) & 6 Equatorial maps (-60 to +60°) which tie in with Polar maps. Cover Messier Objects & stars down to 5th magnitude, which can be seen with the naked eye. **No. P-9099 $1.00 Ppd.**

Pkg. of 25 **No. P-71,113 $20.00 Ppd.**

Rubber Pitch Lap Mat Time Saving Wonder



Avoid disappointing pitch breakouts when hand cutting channels. Pour melted pitch on tool, lay mat on top then press it in with mirror to form channels. When pitch sets, an easy pull will remove the mat. In minutes (instead of hours) you are set to polish.

No.	Size	For Mirror	Price Ppd.
50,171	13½ x 13½"	8", 10", 12"	**$4.50**
60,061	6 x 6"	4¼", 6"	**1.75**

Template For Grinding 6", f/8 Mirror. Also sighting ring & collimating directions. **No. 40,316 50¢ Ppd.**

Abrasives In Shaker Top Containers For Mirror Grinding Or Industrial Use

From coarse to extra fine, should be used in order listed. Guaranteed free from contamination. Shakers help you evenly distribute abrasive and reduce waste . . . last 4 for fast polishing.

Stock No.	Description	Quantity	Price, Ppd.
40,022	#80 Alundum	16 oz.	**$1.95**
40,021	#120 Alundum	6 oz.	**1.25**
40,020	#220 Alundum	4 oz.	**1.10**
40,019	#320 Alundum	3 oz.	**1.25**
40,018	#400 Alundum	3 oz.	**1.10**
40,017	#600 Alundum	2 oz.	**.95**
40,016	#305 Emery	2 oz.	**.95**
40,015	Red Jewelers Rouge	8 oz.	**1.50**
40,152	Cerium Oxide	4 oz.	**2.10**
40,153	Cerium Oxide	8 oz.	**3.95**
40,158	Barnesite	4 oz.	**2.15**
40,159	Barnesite	8 oz.	**4.00**

GRINDING YOUR OWN MIRROR SAVES YOU MONEY.

Astronomical Telescope Mirrors

Polished, aluminized overcoated. *¼ wave or better.

No.	Dia.	F.L.	Thickness	Price
40,913	2½"	25"	3/8"	**$ 6.25** Ppd.
50,082*	3"	30"	3/8"	**16.00** Ppd.
50,051*	4¼"	45" Pyrex	5/8"	**27.50** Ppd.
71,026*	6"	60" Pyrex	1"	**98.00** Ppd.

Parabolic Mirrors . . . Pyrex® Brand Glass

No.	Dia.	F.L.	Thick.	Shpg. wt.	Price
41,357	3"	18"	½"		**$39.25 Ppd.**
5002	6"	48"	1"		**64.00 Ppd.**
85,069	8"	64"	1-3/8"	5.5 lb.	**96.00***
85,070	10"	80"	1-3/4"	11 lb.	**195.00***
85,071	12½"	100"	2-1/8"	21 lb.	**300.00***

*Transportation Charges Collect

Reflector Telescope Optics Kits With Completed Mirrors

Forget the grinding! These kits have all the optics you need! Make your own precision reflecting telescope with these money-saving kits. Each includes a completely finished mirror (¼ wave, aluminized, overcoated); front-surface, aluminized mirror diagonal; eyepiece lenses; instructions. Kits do not include tubes, mounts, etc. Powers given for kits can be greatly increased with shorter F. L. eyepieces or a Barlow lens.

3" Mirror Telescope Optics Kit

You get: (1) 3" dia. mirror, 30" F. L. (2) ½ x ¾" diagonal; (3) 2 plano-convex lenses to make 1" Ramsden eyepiece. Gives 31X. **No. 50,081 $17.75 Ppd.**

4¼" Mirror Telescope Optics Kit

As 3" Kit but has 4¼" mirror Pyrex® brand sheet glass. 45" F. L.; 25 x 35mm diagonal. Gives 45X.
No. 50,074 $32.50 Ppd.

6" Mirror Telescope Optics Kit

6" telescope picks up about 4 times more light than 3" one and you can view stars up to 13th magnitude, resolve star clusters, observe details in Messier objects. Deluxe Kit contains: 1 parabolic mirror, 6" dia., 48" F.L., better than ¼ wave; elliptical diagonal mirror (major axis—1¾", minor axis—1¼", thickness—3/8"); 1 Kellner eyepiece, 1¼" barrel dia., 28mm F.L., 50° field, 2 achromats in alum. mount; inst. "Telescopes You Can Build." **No. 71,191 $85.50 Ppd.**

Good Quality Mirror Mounts

3" An excellent low-cost mount. Unassembled, with directions. Outer dia. 3½". Fits our No. 80,056 cardboard tube or No. 85,012 aluminum. Shims not included. **No. 50,109 $3.85 Ppd.**

4¼" Adjusting clamps act on mount alone. Metal clips hold mirror to mount. 3-point suspension. Mount O. D. 4-7/8". Fits our No. 85,013 alum. tubing, can be shimmed for No. 80,038 tube. Unassembled, with directions. **No. 50,079 $6.75 Ppd.**

6" Cast alum. Completely assembled. Metal clips hold mirror firmly. Outer diameter of mount 6-13/16". Fits tubing No. 85,014 alum. or No. 85,008 cardboard.
No. 50,117 $8.95 Ppd.

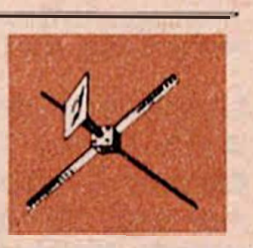
8" Cast aluminum, assembled. Metal clips to hold mirror. O. D. 9". With shims (not incl.) will fit our tubing No. 85,139 cardboard or No. 85,146. **No. 70,072 $11.00 Ppd.**

Deluxe Quality Mirror Mounts

Cast alum. flotation cells support mirror at 9 points. Positive collimation lock. Primed & painted black.
No. 70,537 (for 10" mirrors, 12" O.D.) $49.50 Ppd.
No. 70,538 (for 12½" Mirrors, 15" O.D.) $59.50 Ppd.

Spider Mount For Reflectors

Brass, 4-leg, adaptable to tubes 5-9" I.D. For mirror or prism. 1½ x 2" plate mounted on 45° angle. Adjusts w/set screw. Instr. **No. 50,025 $5.00 Ppd.**



Quality Elliptical Mirror Diagonals

1/8 Wave For 6" Telescopes
Aluminized and overcoated. Just right for an f/8, 6" dia. telescope using normal F.L. eyepieces. Size: major axis 1¾", minor axis 1¼". 3/8" thk. **No. 30,205 $7.95 Ppd.**

¼ Wave For 6" Telescopes
Same as 1/8-wave mirror above, but polished to ¼-wave. **No. 30,188 $5.95 Ppd.**

Large Size to ¼ Wave or Better
Size needed when eyepieces with 1½" F. L. or longer are used. For use with an f/8, 6" diameter mirror, or 8" diameter mirrors with normal focal length eyepeices. Size: 1½" minor axis, 2-1/8" major axis. Thickness 3/8".
No. 30,258 $8.95 Ppd.

Other Sizes to ¼ Wave or Better (Prices Ppd.)
No. 30,259 (7/8 x 1-15/64 x ¼" thick for 3" scope) **$5.50**
No. 30,260 (1-1/16x1½x¼" thick for 4¼" scope) **7.50**
No. 30,261 (1-7/8x2-21/32x3/8" thick for 8", 10" scopes) **16.95**
No. 41,131 (2¼x3-1/6x3/8" for 10", 12" scopes) **28.75**

Mirror Diagonals and Mounts

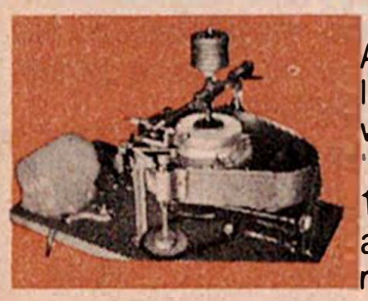
For 3" telescope. Cemented to angle bracket. Mirror face 21 x 29mm. **No. 60,087 $3.00 Ppd.**
For 4¼" telescope. Aluminized and overcoated mirror. Cemented to 4¾" rod and holder. Mirror face measures 25 x 34mm. **No. 60,086 $5.00 Ppd.**

Diagonal Holders

No. 60,035 For 3" to 4¼" telescopes **$1.50 Ppd.**
No. 60,049 For 6" telescopes **$1.50 Ppd.**

Precision Flat Mirrors, see pg. 142.

Lens And Mirror Grinding Machine



Automatically grinds telescope lenses and mirrors in 8 hours without the tedious and tiring "walking around the barrel." 10¼ x 19 x 21" overall, it grinds any 4/8" dia. lens far more accurately than by hand. Adjustable for wide range of accurate grinding oscillations, plus straight-line setting for polishing. When powered by ¼ h.p., 1725 rpm motor (not incl.), turntable speeds range from 35-135rpm. Can be mounted stationary or on portable base. Equipped with motor pulley and belt, motor mount board, 4" test lens and tool, 10 lb. in lead weights, enough various grits and polishing agents to grind your test lens. Instr. Shpg. wt. 62 lbs.
No. 85,194 $149.50 Trans. Chgs. Coll.

EYEPIECE DESIGNS

Selecting the best eyepiece for your telescope is important. The ratio of the objective's F.L. to that of the eyepiece determines the power. The eyepiece magnifies the primary image formed of some distant object by the objective or mirror. The image rays, traveling through the eyepiece system, are compressed into an almost parallel bundle. Field of view is also determined in part by the eyepiece.

(A) Symmetrical. 2 identical achromats spaced a small distance apart.

(B) Concave Lens. Used in Galilean telescopes. Only type that gives erect image. Good only for extremely low power. Very narrow field of view. Single simple lens.

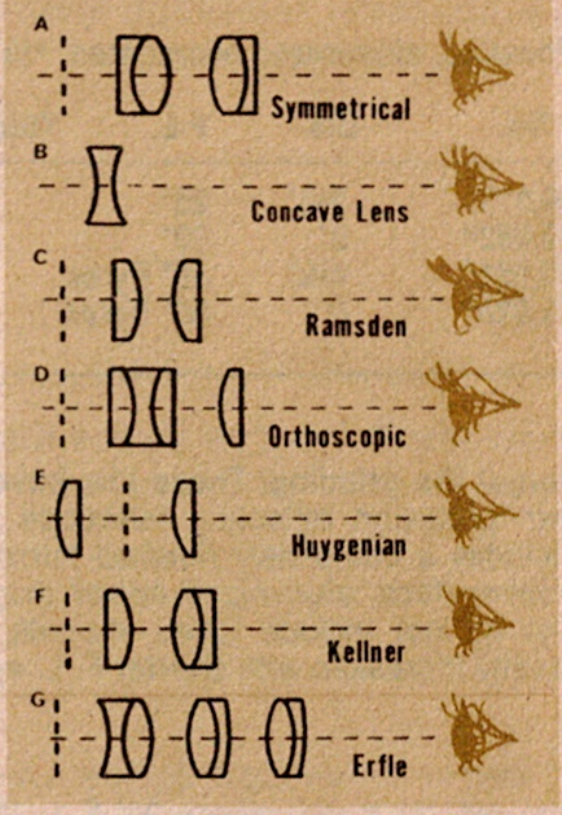
(C) Ramsden. 2 plano-convex or double-convex lenses. Economical. Real image formed in front of field lens. 35-45°. 2 simple lenses.

(D) Orthoscopic. Triplet field lens and plano-convex eye lens. Excellent color correction and wide field . . . 35-50°. Found on very expensive scopes.

(E) Huygenian. Image plane falls between lenses. Better color correction than Ramsden. Excellent for microscopes and telescopes. 25-40° field.

(F) Kellner. Most popular type for telescopes. Achromatized Ramsden for better color correction. 40-55° field.

(G) Erfle. Especially designed for extra-wide field with good correction of all aberrations. 65-70° field. Usually quite expensive.



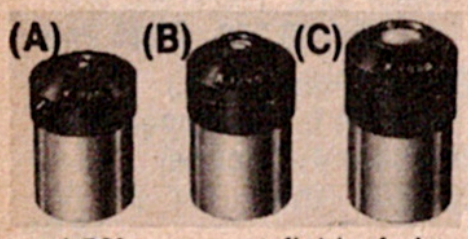
COMPLETE SELECTION ORTHOSCOPIC EYEPIECES

- **Wide Flat Field**
- **Best Correction At High Magnification**
- **Excellent Eye Relief**
- **Coated Optics**

Because of its triplet, an orthoscopic eyepiece is the most popular eyepiece for high-powered viewing. Offers very wide, flat field; excellent spherical and chromatic correction; greater eye relief than a Kellner; and freedom from ghosts and scattered light. These have 4-element design; coated lenses, standard 1¼" O.D.; chrome-plated, brass and aluminum mounts.

Effective F.L.	Power with 48" F.L. Objective	Stock Number	Ppd. Price
4mm	300 Power	**30,364**	**$26.50**
6mm	200 Power	**30,404**	**25.50**
12.5mm	96 Power	**30,405**	**26.75**
18mm	67 Power	**30,406**	**28.75**
25mm	48 Power	**30,407**	**29.50**

Standard Kellner Eyepieces

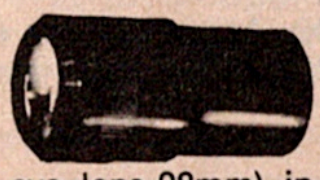


- **Wide, flat fields**
- **Excellent correction**
- **Good eye relief**
- **Coated**

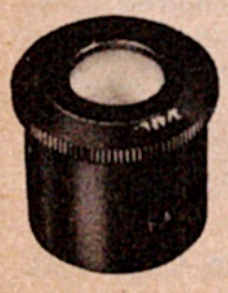
Excellent color correction. Standard 1¼" O.D. and 50° apparent field of view. Ample eye relief. Chrome and black finish with easily visible markings.

Eyepiece	Focal Length	Eye Lens Dia.	Field Lens Dia.	Stock No.	Price, Ppd.
(A)	9mm	5mm	7.5mm	**60,492**	**$15.25**
(B)	12mm	7mm	8. mm	**60,493**	**14.95**
(C)	18mm	15mm	19. mm	**60,494**	**14.25**

Wide Angle Kellner



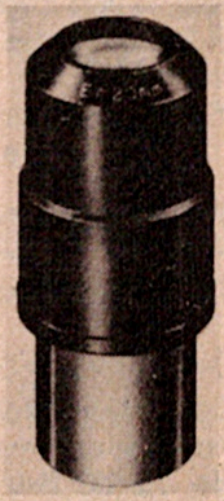
28mm F.L.; Standard 1¼" Mount
Big field lens & long eye relief. 2 achromatically corrected lenses of highest quality (field lens 30 mm, eye lens 28mm) in black anodized alum. cell. **No. 5223 $17.50 Ppd.**



19mm F.L. Symmetrical Eyepieces

Fine eyepiece in standard, 1¼" dia. aluminum mount. 2 coated achromats; 16mm clear dia. **No. 30,316 $9.95 Ppd.**
In standard microscope size mount. 0.917" dia. **No. 30,315 $10.95 Ppd.**

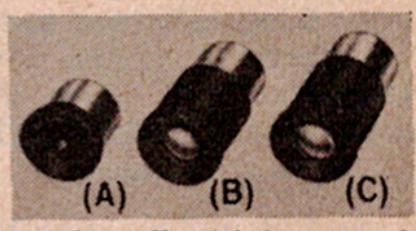
20mm F.L. ERFLE



- **Excellent spherical & chromatic correction**
- **Excellent eye relief • Coated lenses**

Extremely wide (65°) field of view & excellent correction of all aberrations. This precision-made imported Erfle gives you good power for use with refractors, reflectors, rich field telescopes, finder scopes, etc. Standard 1¼" O.D. Dia. of eye lens 22mm, field lens 26mm. Streamlined, modern design with handsome chrome & black finish. **No. 60,495 $41.50 Ppd.**

Japanese Kellner & Orthoscopic Eyepieces



Upgrade Japanese scopes with these top quality chrome & black finish Kellner and Orthoscopic eyepieces. Kellners give wide flat field with very good correction & eye relief. Orthoscopics offer highest quality due to best correction at high magnification. We recommend these as an ideal way to expand power ranges of typical small Japanese telescopes.

Eyepiece F.L.	Barrel O.D.	Stock No.	Price Ppd.
(A) 6mm	**.964 In.**	**41,805**	**$25.50**
(B) 18mm	**.965 In.**	**41,803**	**12.50**
(C) 25mm	**.966 In.**	**41,804**	**12.95**

SATISFACTION GUARANTEED OR YOUR MONEY BACK.

Wide-Angle Erfle Eyepieces With 68° Field

Available Again After 6 Years

This war-surplus eyepiece contains 3 coated achromats (eye lens 39mm dia. 63mm E.F.L.; center lens 45mm dia. 78mm E.F.L.; field lens 45mm dia. 166mm E.F.L.) set in spiral thread focusing mount (3/8" focus travel). Exceptionally good image quality, 32mm F.L. Big wide field for Richest-Field scopes. **No. 5160 $31.95 Ppd.**

Adapter. Converts above to standard 1¼" O.D. Set screw locks in position. **No. 30,171 $3.95 Ppd.**

Ramsdens—Mounted in Aluminum Barrels

Standard 1¼" O.D.; 2 excellent plano-convex lenses in black anodized alum. Give barrels clear image. Directions incl. for using short F.L. eyepieces.

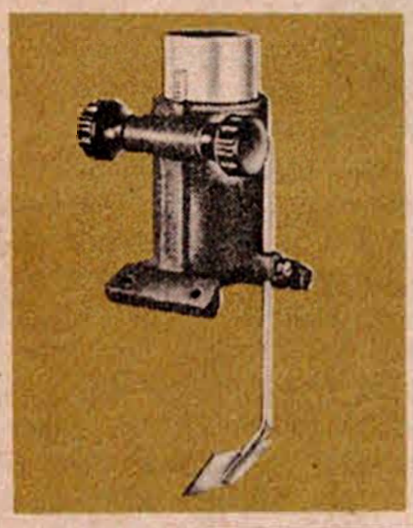
6mm F.L. **No. 30,204 $6.50 Ppd.**
12.7mm F.L. **No. 30,203 $5.25 Ppd.**

Above, but 0.917" O.D.

6mm F.L. **No. 30,195 $5.95 Ppd.**
12.7mm F.L. **No. 30,198 $5.25 Ppd.**
25.4mm F.L. **No. 30,194 $4.95 Ppd.**

25.4mm F.L. w/etched glass crossline reticle O.D. 0.917". **No. 30,334 $8.95 Ppd.**

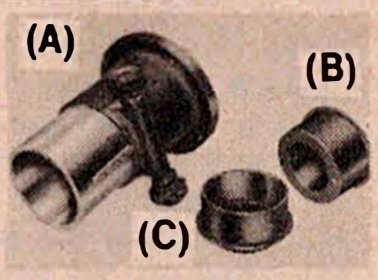
Eyepiece Mount Rack & Pinion



A rack and pinion focusing mount at an amazingly low price. Takes standard 1¼" eyepieces. Micrometer-smooth focusing action, 2¼" travel, 2 focusing knobs, variable tension; 4 mounting holes for greater rigidity, nuts and bolts included, cast aluminum; black wrinkle finish; chrome tube. Diagonal holder not incl.

No. 50,077 $9.50 Ppd.

Giant 2" I.D. Focusing Mount



For telescopes, photo. & optical instruments. Accepts wide light cone for long F.L. eyepieces & low-power, wide-angle images without restricting field of view. Go to low power with big telescopes; use short F.L., large-aperture objectives. 3-7/8" dia. mounting flange fits standard telescope tubing (#85,012, pg. 72). Use to make refractor scope, etc. Rack & pinion focusing adj., 2¼" travel; anodized alum. casting; 4 mounting holes. 3". Instr.

(A) Focusing Mount. **No. 60,769 $29.50 Ppd.**
(B) Standard Eyepiece Adapter for Focusing Mount. 2" O.D. x 1-1/8". Instr. **No. 41,209 $7.50 Ppd.**
(C) Camera Adapter attaches 2" Focusing Mount to "T" adapter. 1-1/8 x 2¼" O.D. **No. 41,208 $9.95 Ppd.**
Wide-Angle Erfle Eyepiece. For giant focusing mount without adapter: use suitable objective & tube. Field of view 68°; 32mm F.L. 2" O.D. **No. 41,347 $39.50 Ppd.**

Telescope Image Erector

For terrestrial use. 2 fine-quality, coated achromats in black phenolic tube (9½" long). Fits standard 1¼" holders incl. our No. 80,162; 85,105; 85,086 & 85,143. Attach, insert eyepiece, focus. Image right side up; correct right & left. **No. 50,276 $18.00 Ppd.**

Zoom Eyepiece

• Does work of 3 or 4 eyepieces—no lost refocusing time

• True zoom . . . stays sharp at all powers

Unlike pseudo "zoom" optics, this eyepiece needs only one focusing, subject stays in focus whether you're at 8.4mm or 21mm F.L. Standard 1¼" O.D. Fully orthoscopic, coated lenses give wide flat field. Excellent spherical and chromatic aberrations correction. Typical magnifications are 50-125X (increase 2-3 times with Barlow). **No. 60,362 $43.00 Ppd.**

Blackened Brass Eyepiece Tubing

3 dia. give a slide fit when used together. Use as eyepiece, focusing tube, holder respectively.

Stock No.	Length	I.D.	O.D.	Price, Ppd.
117	3"	1-3/16"	1-1/4"	**$1.80**
118	2"	1-1/4"	1-5/16"	**1.50**
40,161	3"	1-5/16"	1-3/8"	**1.80**

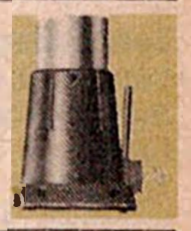
High Quality Filter Cell

See red spot on Jupiter, polar ice cap on Mars! Accurately holds 21mm filters (below) in standard Orthoscopic & Kellner eyepieces. Unmounted filters interchangeabe. Low-cost photo-type filters also usable. Black anodized filter cell. Body screws in open eyepiece end; filter secured with threaded retaining ring. O.D. threaded 28.6 x .6mm. Instr. **No. 41,763 $2.54 Ppd.**

High Grade Solid Optical Glass Filters . . . 21mm dia. First economical solid optical glass filter for the serious amateur or professional. For use with Cell above.

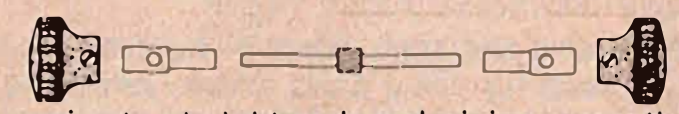
Each $4.43 Ppd. **Red No. 30,666**
Dark Red No. 30,667 **Green No. 30,668**
Yellow No. 30,670 **Orange No. 30,671**

Standard 1¼" Slide-Focus Eyepiece Holder



Economical, plastic unit has 3" focusing sleeve and locking screw for diagonal holder. **No. 60,067 $3.50 Ppd.**

Helical Gear Shaft and Knobs



Far superior to straight rack and pinion; smooth operation. One piece steel shaft and helical gear. Brass bushings. 14 teeth per in., face 236", pressure angle 14½", pitch 14, shaft .177" dia., length 2-3/8". Gear O.D. 275". **No. 40,197 $3.25 Ppd.**

Brass Helical Rack. Meshes with gear above.

Length 4" **No. 40,196 $1.75 Ppd.**
Length 11¾" **No. 40,195 $4.75 Ppd.**

Rack & Gear Focusing Mechanisms 1/8" face spur gears, pressure angle 14½°, pitch 48.

Brass Spur Gears No.	O.D.	Hole	Teeth	Price	Brass Racks No.	Size	Price
40,055	1/4"	3/32"	10	**$1.35**	**40,060**	4"	**$1.15**
40,056	19/64"	1/8"	12	**1.40**	**40,054**	6"	**1.75**
40,058	3/8"	1/8"	16	**1.35**	**40,053**	12"	**3.00**

Brass Gear Shaft With Knobs. ¼" dia., 10 teeth, 48 pitch, 2" long. Meshes with brass racks above, 7/8" dia. Knobs fit ends, set screw locked. **No. 40,164 $1.50 Ppd.**

INSTEAD OF THIS

SEE THIS

BARLOW LENSES

Double Or Triple

Your Telescope's Power

A Barlow lens is designed to double or triple the magnification of a telescope with only a slight increase in focal length. One of the most practical accessories you can buy, it eliminates the need for hard-to-use, short focal length eyepieces or long, cumbersome telescope tubes. By narrowing the cone of light, it often improves eyepieces performance particularly Huygens or Ramsden types. It is a negative lens placed in eyepiece tube.

Original Goodwin, Achromatic, Coated Barlow

Made to original specs, as optically perfect as precision craftsmen can make. Cemented, 2 element achromat especially made for it. Effective F. L. of 44mm (–1.73"). Coated achromat mounted in cell held by spring tension in 4" long blackened adapter tube (accepts standard 1¼" eyepieces). Position in tube easily changed to fit individual scopes. Instr. **No. 60,122 $26.95 Ppd.**

Japanese Barlow

Mounted in telescoping tubing (0.965 O.D. x 4" long). Standard for most Japanese scopes (measure eyepieces before ordering).
No. 30,370 $8.50 Ppd.

Color-Corrected, 2-Element Barlow Lens

Enjoy your telescope more with our color-corrected 2 element Barlow. Position of lens element can be changed in mount to vary power, doubles or triples power, provides increased eye relief—46.6mm F.L. Phenolic tube mount, dull black inside and outside. Slides in standard 1¼" I.D. eyepiece focusing tubes, takes 1¼" standard eyepieces. **No. 40,477 $9.75 Ppd.**
Unmounted lens only **No. 30,448 $5.75 Ppd.**

See space views really close up . . . the fantastic new Space Slides are pictured on pages 22 and 23.

Telescope Tubing . . . All Sizes

No.	I.D.	O.D.	Lgth.	Description	Wt. Lb.	Price
80,056	3-9/16"	3-13/16"	32"	Spiral paper	*1½	**$2.25**
80,038	4-7/8"	5-1/4"	46"	Spiral paper	*6	**6.25**
80,081	1-7/8"	2"	48"	Aluminum	*3	**5.75**
85,008	6-7/8"	7-3/8"	60"	Spiral paper	*10	**6.95**
85,011	2-7/8"	3"	48"	Aluminum	*5	**12.50**
85,012	3-7/8"	4"	60"	Aluminum	*6	**15.00**
85,013	4-7/8"	5"	46"	Aluminum	*6	**17.50**
85,014	6-7/8"	7"	60"	Aluminum	*22	**23.50**
85,139	9"	9-3/4"	72"	Spiral paper	†22	**13.50**
85,146	9-1/4"	9-1/2"	63"	Phenolic	†10	**49.75**

(*Postpaid U.S.A. only.) (†Trans. Chgs. Coll: normally shipped R.E.A.; check local office for poss. premium shipping fees.)

See Black and White Optical Paints on page 135.

Low-Reflectivity Foam Sheeting . . . Keeps light reflection at absolute min. 100% better at absorbing light than ordinary black paper. Ideal for lining telescope tubes, etc. Can be glued, taped, or laid on smooth surface. 3/32" thk. black open pore, highly flexible foam sheeting (3¾ X 9 ft.); 9 oz. **No. 80,136 $6.50 Ppd.**

Pressure-Sensitive Flock Paper

Peel off backing and apply. Ideal for building or improving a telescope for lining tubes. Black, velvet-like, non-reflecting surface provides millions of light traps, far superior to flat, black paint. 20 x 30" sheets.

Single sheet **No. 70,621 $2.50 Ppd.**
Pkg. of 50 sheets **No. P-70,622 $78.00 Ppd.**
Non-Adhesive 27 x 36" sheet. **No. 60,068 $2.00 Ppd.**

Quality Star Spectroscope

5 prisms, 3 cap-mtd. cyl. lenses, and adapter for low-power orthoscopic eyepieces. Resolution power: 1m (separates D double line). **Not for sun and moon spectra.** Scopes with 1½-3" dia. objectives pick up spectra of 1-3 magnitude stars; 4" dia., spectra of fainter stars. Instr. Imported.
No. 50,023 $67.55 Ppd.

Rubber Eyeguards

Excellent war surplus. Will stretch slightly for fitting.
1½" hole dia.; 2¼" ht. **No. 60,099 $1.00 Ppd.**
1-1/8" hole dia.; 1¼" ht. **No. 60,100 $1.10 Ppd.**

The Entire Heavens of 6/30/1973

Gigantic Celestial Map

A gigantic, 6½ x 3½-ft., celestial map ideal as a wall decoration or teaching tool . . . that will never be obsolete. The largest single printed map with the most designated stars . . . 5,179 shown as white discs on navy blue field. This unique rectangular map gives users a straight on, all encompassing view of the heavens. No need to twist or turn your head to see the stars the way you most often see them. Printed on heavy paper with all Yale Catalog designations; Bright Star & Flamsteed Numbers; Greek letters; 250 star names; all 88 constellation names; degree scale. Descriptive sheet incl. **No. 80,189 $9.00 Ppd.**

Junior Planetarium Brings Outer Space Indoors

Learn the Night Sky

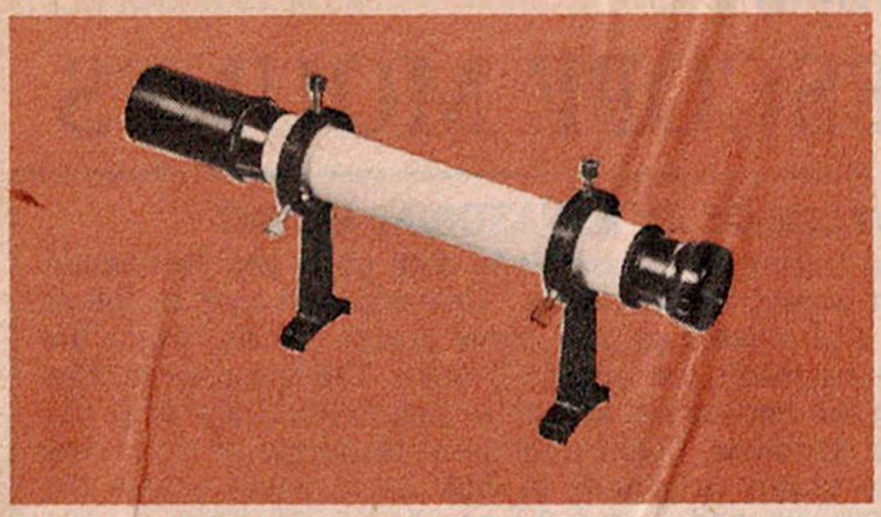
Projects over 60 constellations and hundreds of stars on wall and ceiling! Easily adjusts to show the stars in any month of the year anywhere in the Northern Hemisphere. Rotate the sphere by hand to demonstrate stars daily movement. Once you can recognize the stars indoors, go outside on a clear night, and the sky will be as familiar as your ceiling. 14" plastic Planetarium on 3-7/8 x 5-7/8" base. On/off switch. Incl. pointer and instructions with star charts. Operates on "D" batteries (not incl.) **No. 71,448 $17.25 Ppd.**

Substandard Eyepiece Adapters

Change substandard eyepieces to standard 1¼" focusing mounts. Eyepiece fastened with small set screw. Black, anodized aluminum.

For 0.917" O.D. (microscope size eyepieces). **No. 30,199 $1.95 Ppd.**

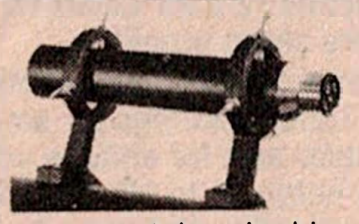
For 0.965" O.D. (Japanese telescope standard eyepieces). **No. 41,615 $1.95 Ppd.**



Edmund 6X Finder Telescope

A low-cost, good-quality finder with adjustable ring mounts. White enameled aluminum telescope has spiral-focusing, achromatic objective with light-shade. Ramsden eyepiece (thread focusing) incl. wire crosslines. Cast aluminum mount, wrinkle finish, fits any telescope. Objective has 23mm clear aperture. Approx. 9" long, less than 8 oz. **No. 50,121 $17.50 Ppd.**

7-Power Finder

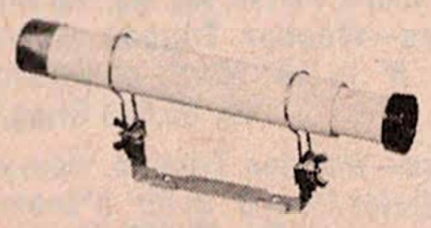


30mm dia., achromatic objective; Ramsden eyepiece; glass, crossline reticle. Black-anodized alum. tube; 8" long, 1½" O.D., 8 oz. Slide focusing eyepiece mount has locking screw. 7X Finder (without mount).

No. 50,080 $20.50 Ppd.

Finder Ring Mounts (Illustrated Above). Lightweight, 2" I.D. rings. Each has 3 thumb screws for adjusting finder. Cast alum. construction. Incl. nuts & bolts to mount on any scope. **No. 50,075 Per Pair $4.75 Ppd.**

Low-Cost 3X Finder



31mm objective lens in spiral-wound Kraft tube with slide-focus eyepiece. 8½" long x 1¼" O.D.

No. 60,363 $3.50 Ppd.

Chart The Stars With Sky & Earth Globe

Stationary clear plastic globe (7" dia.) shows relative positions of stars (equator calibrated to show days & months). Inner (4" dia.), revolving relief globe is Earth (longitude & latitude markings). Find stars in an area by rotating "Earth" & locating position. Quadrant scale to estimate solar time & position, etc. Incl. Edmund Star Finder, pocket atlas, instr. Stands almost 10" high. **No. 70,984 $15.00 Ppd.**

Find Sky Objects Easily w/Setting Circles

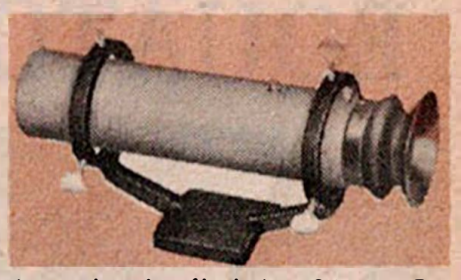
Set of two plastic setting circles (1/16" thick) with easy-to-read markings and ¼" dia. center holes. Just dial proper numbers in Right Ascension Circle (has 3 scales: 0-24 hr.; hr. angle 0-6-0; and sidereal hr. angle 0-360° of arc) and Declination Circle (0° to ±90°).

8" Dia. Setting Circle Set **No. 50,133 $3.00 Ppd.**
5¾" Dia. Setting Circle Set **No. 50,190 $3.50 Ppd.**

Star Time Calculator— Slide rule automatically converts from star or sidereal time to standard. Saves time & many math calculations. Plastic-coated cardboard rule; 10 3/8 x 3 5/8". **No. 40,399 $2.00 Ppd.**

Find your way among the Heavens, see the new Astro Murals and Constellation Post Cards on pages 22-23.

6X Deluxe Finder With Twin-Ring Mount

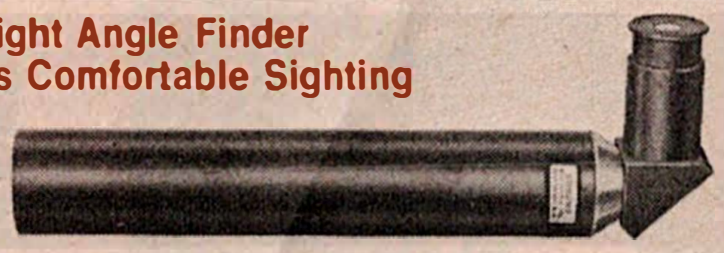


Finder (with glass crossline reticle) as on 8" reflector (pg. 56). 50mm dia. objective offers excellent light-gathering power. Wide-angle eye-piece gives exceptionally large field. Black cast alum. with wrinkle finish, 6½ x 5" mount has 6 adjustment screws (3 on each 2-7/8" I.D. ring).

No. 70,175 $42.50 Ppd.

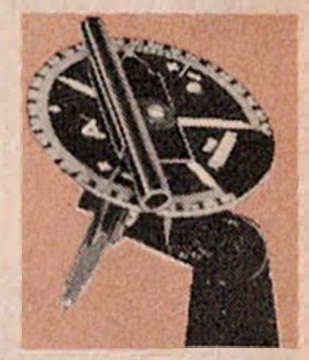
Single-Base, Twin Ring Finder Mount (same as on above unit) offered separately. Use on any telescope (takes up to 2¾" O.D.). **No. 70,079 $11.75 Ppd.**

7X Right Angle Finder Gives Comfortable Sighting



More comfortable & convenient than straight finder scope. Mount close to eyepiece for fast shifting of eye from finder to telescope. 30mm dia. achromatic objective, Ramsden eyepiece, glass crossline reticle. Black, anodized alum. tube 8 x 1½" O.D. Slide focusing eyepiece w/set screw. **No. 50,249 $20.95 Ppd.**

Edmund Star Finder: Guide to the Skies



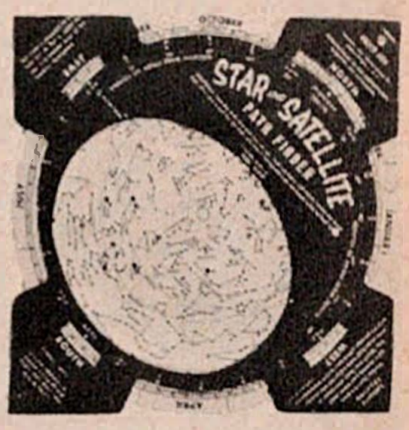
Locate and identify any charted visible star with this precision-made metal instrument. Aim at an unknown star and locate it on the star map (incl.). View is erect, same size and brightness. Use with telescope to locate double stars, clusters, etc. Study elementary celestial navigation or surveying. 2 large, easy-to-read dials let you get finder on target according to hour angle of declination. 8 x 4 x 7¼". Use on any tripod or simple mount. **No. 70,501 $10.75 Ppd.**

1X Riflescope Converts To 8X

Directions incl. on converting to 3X without changing lenses or up to 8X using lenses available from us. Military reticle. Length 8-7/8", dia. 7/8".

No. 50,032 New, not coated. $4.95 Ppd.

Rotating Star And Planet Finder



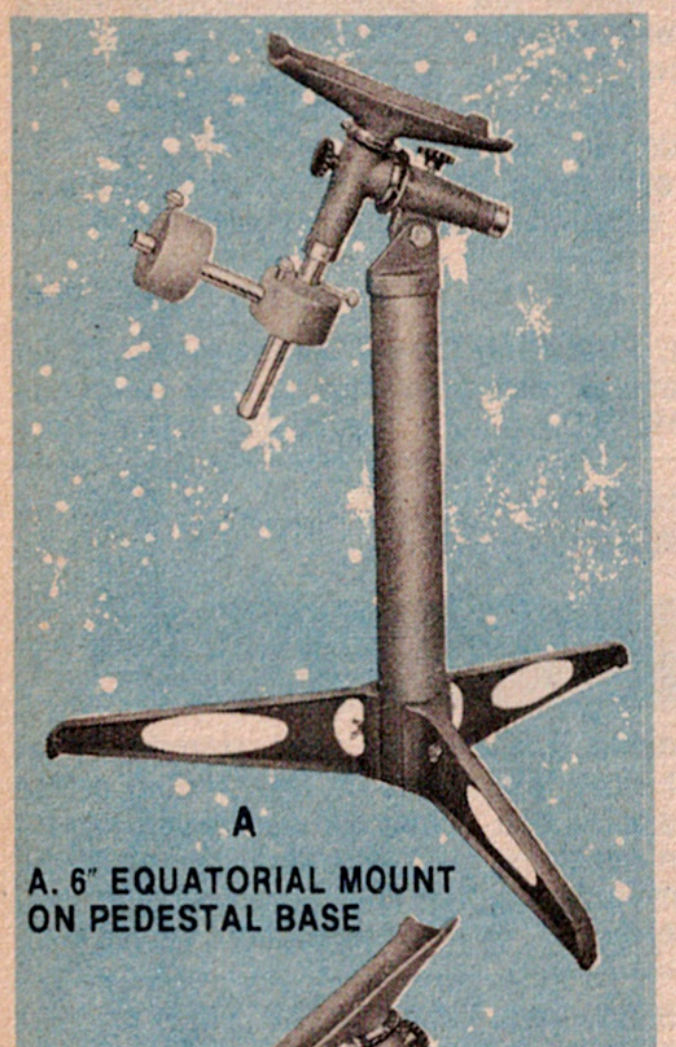
Rotating "roadmap of the heavens" chart shows over 500 stars & their relationships at any time. Turn the disc until date & time are set, positions of stars on chart will match those stars in the sky. Reverse side contains astronomical facts. Incl. 16-pg. booklet "Star Paths", shows how to use it, simplified celestial sphere drawings, etc.

No. 9227 50¢ Ppd.
Pkg. of 25 No. P-70,156 $10.00 Ppd.
Pkg. of 100 No. P-80,063 $30.00 Ppd.

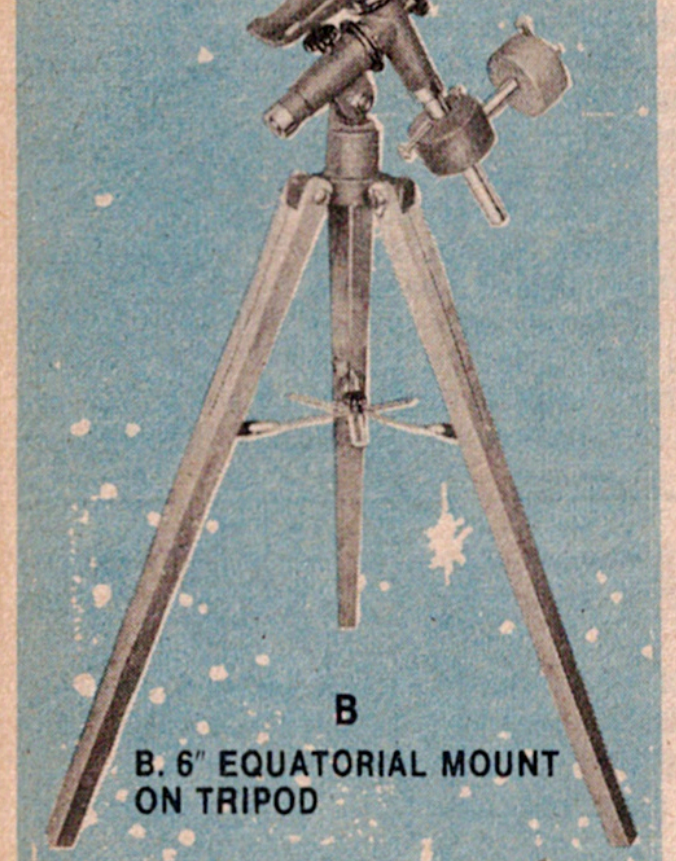
Make Star Charts. Cut and fold (25) 11 x 17" star maps into working star charts. **No. P-9061 $1.00 Ppd.**

FOLLOW STARS EASILY WITH EDMUND . . .

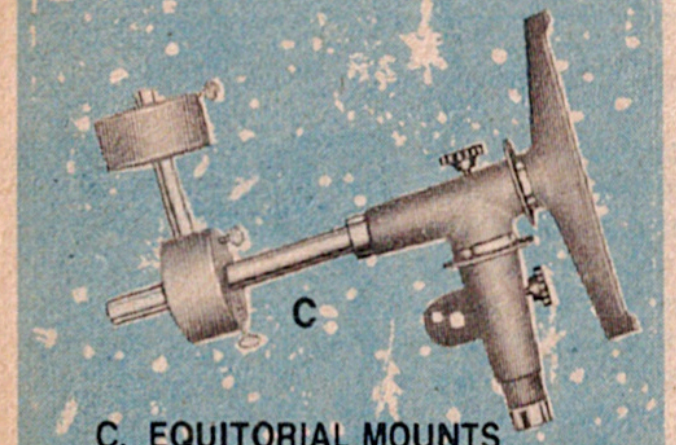
EQUATORIAL TELESCOPE MOUNTS



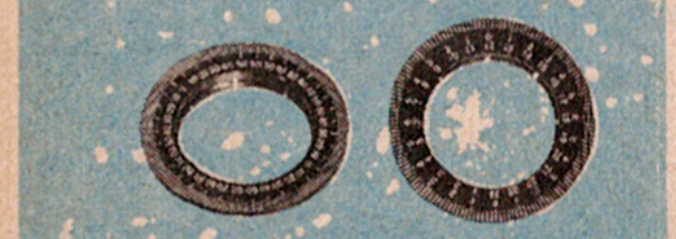
A. 6" EQUATORIAL MOUNT ON PEDESTAL BASE



B. 6" EQUATORIAL MOUNT ON TRIPOD



C. EQUITORIAL MOUNTS



POST CAPS

VALUE OF AN EQUATORIAL MOUNT

An equatorial mount is equipped with both polar and declination axes at right angles to each other. This makes it easy to follow stars, moon and planets as they move across the sky. Point the polar axis at the North Star and fix it there. The telescope is then moved about the declination and polar axis to find the star or object you wish to follow. Slight rotation of telescope on polar axis will keep the object constantly in view as it moves across the heavens. Better still, add a clock drive to do your tracking.

Fine Setting Circles Supplied on All These Mounts . . . making it much easier to find objects in the sky.

6" Reflector Equatorial Mounts (Teflon Bearings) With And Without Clock Drives

Same fine mounts with Teflon bearings, setting circles and clock drives used on our 6" Reflector (page 63). Also excellent for 4" and smaller refractors. 2-axis balancing allows for additional equipment anywhere along scope.

1. Sturdy design to eliminate vibrations.
2. Precision Teflon bearings for smooth operation.
3. Variable polar axis for altitude adjustment.
4. 12" cradle holds up to 10" dia. tube; but best for 3-6".
5. Big friction holding knobs on both declination and polar axes.
6. Pleasing gray wrinkle finish.
7. 23"-high pedestal of heavy gage, 3" steel tubing, 3-toed base.
8. Tripods made from kiln dried hardwood.
9. Setting circles included.

A. Clock Drive, Heavy-Duty Mount, Pedestal. Provides adjustment of polar angle from 0° at the Equator to as far North as Fairbanks, Alaska (66°). **No. 85,111 Shpg. wt. 48 lbs. $105.00 T.C.C.**

Heavy-Duty Mount, Pedstl. **No. 85,108 Shpg. wt. 46 lbs. 55.00 T.C.C.**

B. **For Reflectors—Wooden Tripods.** Heavy-Duty Mount, 32" Tripod. Adjusts from 8° to 66° North of Equator (Panama to Fairbanks, Alaska). **No. 85,023 Shpg. wt. 38 lbs. $49.50 T.C.C.**

For Refractors—Wooden Tripods. Heavy-Duty Mount, Clock Drive, 60" Tripod Adjusts from 8° to 55° (Panama to Juneau, Alaska). **No. 85,082 Shpg. wt. 42 lbs. $109.50 T.C.C.**

Heavy-Duty Mount, 60" Tripod. Adjusts from 8° to 66°. **No. 85,034 Shpg. wt. 40 lbs. $59.50 T.C.C.**

4¼" Reflector Equatorial Mounts (Teflon Bearings) With or Without Clock Drives (Not Illustrated)

Same fine drive (described on page 75) and mount used on our 4¼" reflector. Excellent for up to 3" refractors. Mounted on same sturdy pedestal base as our heavy-duty equatorial mount, or on 40" and 60" tripod legs, or without legs. While not as rugged as heavy-duty above, it will give lots of pleasure by eliminating continual adjustment. Ideal for amateur who wants a real clock drive, equatorial mount & sturdy pedestal base or tripod at min. cost.

Med.-Duty Mount, Clock Drive, Pedestal. **No. 85,112 Shpg. wt. 35 lbs. $87.50 T.C.C.**

Med.-Duty Mount on Pedestal. **No. 85,109 Shpg. wt. 33 lbs. 39.00 T.C.C.**

Med.-Duty Mount, 40" Tripod. **No. 85,009 Shpg. wt. 18 lbs. 34.00 T.C.C.**

Med.-Duty Mount, 60" Tripod. **No. 85,015 Shpg. wt. 20 lbs. 38.00 T.C.C.**

C. ### Equatorial Mounts For 6 & 4¼" Scopes

Same as above mounts, but without tripod or pedestal. 6" scope has new 2-axis balancing system. With setting circles.

Heavy Duty For 6" Scopes

With clock drive. Polar angle adj. from 0° (Equator) to Fairbanks, Alaska (66°). **No. 85,083 Shpg. wt. 32 lb. $95.00 T.C.C.**

Without drive. **No. 85,084 Shpg. wt. 30 lb. $40.00 T.C.C.**

Medium Duty For 4¼" Scopes. Without drive. Polar angle adj. from 0° to North Pole (90°). **No. 70,257 Shpg. wt. 14 lb. $20.50 T.C.C.**

Post Caps for above.
For 6" **No. 40,771 $5.75 Ppd.** For ¼" **No. 40,772 $4.50 Ppd.**

BE SURE TO SEE OUR NEW DRIVE CONTROL ON PAGE 18.

Follow Stars Effortlessly!
WITH ELECTRIC CLOCK DRIVE

- **Slow Motion Control—sensitive, manual compensating lever for more precise tracking with or without electricity; & better photos**
- **Quick Clutch—balance scope in seconds**
- **Accurate—properly mounted on polar shaft**
- **Accepts low-cost, clock driven setting circle**

Once a star is located, the drive takes over and keeps it in the field for any normal viewing period.

SLOW MOTION CONTROL corrects for even the minute variation (less than 4 min./day) of the clock itself from true sidereal time. Lever operates sensitive cam which moves whole clock assembly and adds cam's correction to uniform drive rate of clock.

Friction-type QUICK CLUTCH releases quickly with thumbscrews for initial balancing only. Clutch then lets you move scope quickly without damaging drive.

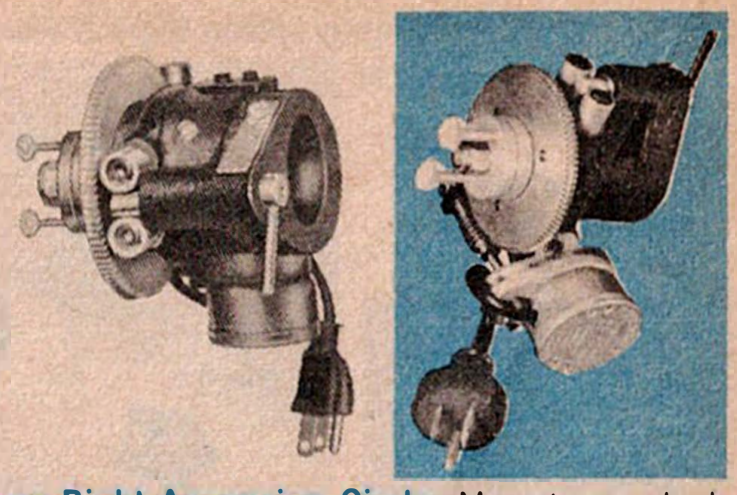
Motor and large 3" pitch dia. 96-tooth, hardened aluminum gear, & ground and polished steel worm give smooth performance with great torque. Factory assembled for precision, easily installed in minutes.

Same drive supplied with mounts on page 74. Adaptable to almost any mount by fitting to polar shaft. Supplied with housing clamp with either 1 or 1½" hole (this clamp with pin takes the reaction to the drive & also serves as slow motion compensator). High quality 1/15 rpm motor: 3-prong plug for outdoor safety. Operates on 110v, 60-cycle AC current. Instr.

Clock Drive (fits 5/8" shaft and 1" housing). May be bored out to fit shafts 5/8" to 1". Fits our telescope mounts Nos.: 85,105; 85,009; 85,109; 85,015; 70,257.
No. 70,726 $55.25 Ppd.

Clock Drive (fits 1" shaft and 1½" housing). Fits our telescope mounts Nos.: 85,034; 85,108; 85,084; 85,023.
No. 70,725 $55.25 Ppd.

Clock Drive (bored to fit polar shaft of later model Edmund 8" telescope mounts with shaft end turned down to 1" O.D.)
No. 70,788 $69.00 Ppd.



Clock-Driven Right Ascension Circle. Mounts on clock drives 70,725; 70,726; 70,788 to provide sidereal time & end calculation of star positions. Black phenolic circle, 5-¾" dia., w/pointer & mounting hardware. Hour & degree scales. 1-11/16" center hole. **No. 60,569 $9.00 Ppd.**

Manual Slow Motion Control Kit for Declination Axis
Holds star within any 4° to 5° declination. Incl. declination shaft block with eccentric pin & manual tracking compensating lever. Fits scopes 85,086 & 85,087; mount 85,082, or homemade mounts with 1" shaft & 1-5/8" declination shaft housing. Black & cadmium finished alum. 3½ x 2 x 2½". Instr. **No. 60,574 $19.50 Ppd.**

Clock Drive Motor. Synchronous-type elec. motor operates on 110v AC. 3/16" dia. x 2-¼" shaft rotates 1/15 rpm counterclockwise; torque 30 in.—oz. 2 mounting holes. 6" leads. Size (excl. shaft) 2-1/8 x 1-5/16 x 2-7/16". **No. 50,199 $8.00 Ppd.**

Matching Worm and Wheel Set. When used with electric motor your telescope will follow the stars. 3" pitch dia., 32 pitch, 96 teeth, 7/32" face, .375" dia. bore. Steel worm w/.1875" dia. bore. **No. 30,307 $20.00 Ppd.**

Operate Clock Drive Anywhere

Small inverter supplies 110v, 60 cycle electricity from car battery. Also can operate electric shaver. 15 watt rating. 2½ x 2½ x 4". 2 lbs. For 12v battery only. **No. 50,346 $28.25 Ppd.**

For the FIRST time, a variable speed and slow-motion controller at a sensible price! The latest solid state design for precision tracking—solar, sidereal, lunar and planetary rates—for details see page 18.

Telescope Mount

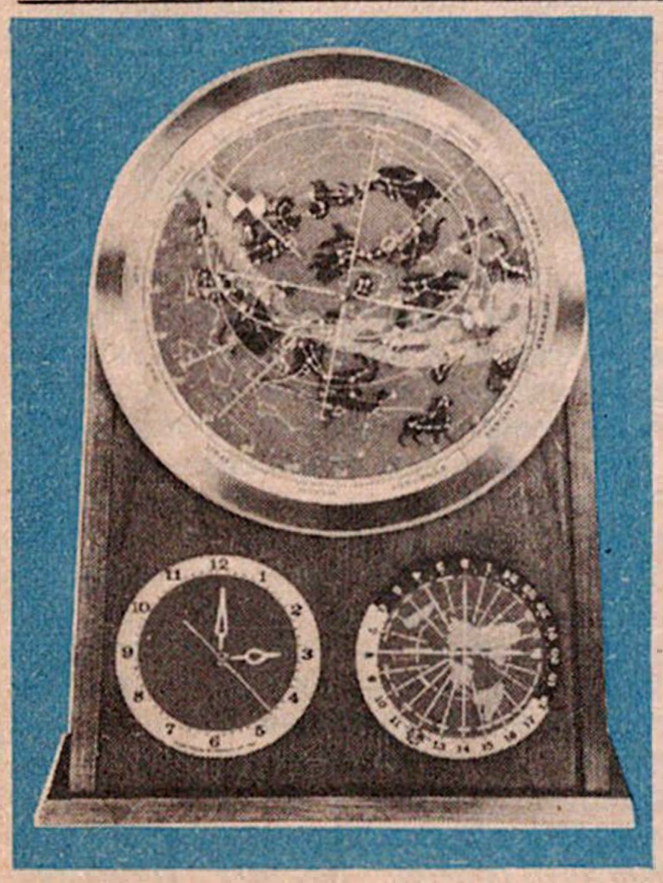
Fits tubes to 5¼" in dia. and any photographic tripod. Zinc-coated metal. Top piece 6½ x 2" **No. 30,180 $7.65 Ppd.**

"Mounting Your Telescope" by Sam Brown. Materials & methods. 8½ x 11"; 36 pages. illus. **No. 9082 75¢ Ppd.**

Pedestals For 6" & 4¼" Scopes

Sturdy, three-toed, 23"-high pedestal base for Heavy Duty Mounts No. 85,084; 85,083. Mounts bolt to 3/8" hole in top cap (can be enlarged to accept other mounts). Heavy-gage steel tubing; gray wrinkle finish.

No. 85,142 Fits our 6" **$20.50 Ppd.**
No. 85,122 Fits our 4¼" **$20.75 Ppd.**
Set of three toes only. No. 70,693 **$16.25 Ppd.**



SPILHAUS SPACE CLOCK
"World's Most Informative Clock"

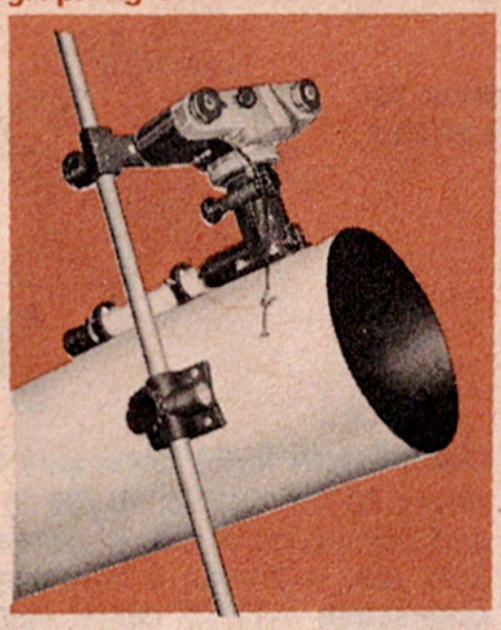
Created by leading American Scientist, Dr. Athelstan Spilhaus. Large top dial has 5 transparent overlay discs. 4, rotating independently, combine with fixed disc to capture depth of night sky. It shows 19 up-to-the-minute pieces of information related to time, moon, sun, stars and tides: 1) Horizon and visible heavens; 2) Sun's position; 3) Moon's position; 4) Position of stars; 5) Relative positions of sun, moon & stars; 6) Day, month, year. A perpetual calendar; 7) Meridian solar-time of sun, moon & stars; 8) Sidereal of star time (with tables); 9) Current phase of moon; 10) Time of daily sunrise, sunset; 11) Mean time of moonrise, moonset; 12) Mean time of star-rise, star-set; 13) Current time of high or low tide; 14) Current stage of tide; 15) Mean solar time; 16) Ordinary or zone time; 17) 24-hour time; 18) Universal or Greenwich Mean Time; 19) Time in major cities of USA and world (L. M. T.).

Expertly engineered: Easily set for any location in the Northern Hemisphere. No periodic adjustments are necessary.

Solid cherry case, fruitwood finish; brush finished brass top; domed crystals; soft 3-point illumination; push-button control. 115v AC clock motor (other voltages and cycles available on special order). 1-yr. materials & workmanship guarantee. Illum. dials. 15-3/8" high; base 11¾ x 5" wide. Manual incl. 32pp. Shpg. wt. 13 lb. **No. 1202 $295.00 T.C.C.**

Camera Body For Photographing Stars & Planets

- Excellent for general picture taking too!
- Complete with adapters for direct hook-up

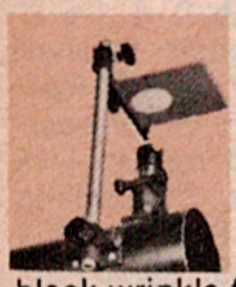


35mm single lens reflex camera body for astrophotography. Ideal for prime-focus use with scopes. Camera adapter screws into lens mount of camera body; a second "T" adapter screws into first and has 1¼" O.D. for direct hook-up to all standard 1¼" eyepiece mounts. Both adapters included.

Easy to operate. Has: focal plane shutter, built-in penta prism for eye-level viewing; swing-open back; self-timer; film advance lever; instant return mirror. Separate knob to set shutter speeds from 1/30-1/500 second and B, with M and X synchronization. Great for general picture taking. Close focus distance, 19 in., standard PC threaded mount for easy adding of lenses. **Hint:** For vibration-free astro photographs we suggest placing a black card or hat over the telescope, release shutter to begin exposure—remove, then place the hat or card over the scope again before completing the exposure. **No. 71,865 $99.95 Ppd.**

For rigid mounting, use Camera Holder, No. 70,162 below. Order Book No. 9078 listed left, below, for photographic hints and instructions.

Camera Holder & Sun Screen For Scope



Use your telescope, eyepieces & camera with this set to take photos. Incl. bracket to permanently bolt to scope. To take pictures, attach rod & camera holder. The latter, adjustable on 28¾" long rod, has standard ¼"-20 thread to fit camera tripod receptacle. Lightweight alum. with black wrinkle finish. Place sun projection screen behind eyepiece, point scope at sun, move screen to focus.
No. 70,162 $12.50 Ppd.

"Observing The Sun" While the safest method is Sun **projection** (using equipment on this page), this pamphlet describes **direct** observation with Herschel Wedges and Sun Filters. **No. 9056 15¢ Ppd.**

Mounted Herschel Wedge. Fits holder No. 50,077 for 4¼", 6" reflectors. 5 x 3/32" rod long enough for 4¼, 6 & 8" mirrors. Wedge angle -10°. Critical surface flat to ¼ wave. 40 x 55mm. **No. 30,266 $7.95 Ppd.**
Unmounted Wedge. **No. 30,265 $6.95 Ppd.**

Sun Filter. Protects the eyes. Transmission of total visible spectrum: 0.027%. 1¼" dia. x 3mm thick.
No. 2729 $2.00 Ppd.

"Photography With Your Telescope" By Sam Brown

How to take exciting photos of moon, planets, stars; distant shots of birds, animals, etc. through the "big eye" of your telescope. Regular telephoto systems aver. only 2X to 3X. With your scope you choose the power! Book incl.: Refractor & Reflector as Cameras. Using Photo Optics, Mounting Camera, Auxiliary Lenses; spacing tables, image sizes, fields, etc. (8½ x 11"). 36 pp. **No. 9078 Only 75¢ Ppd.**

"Star Gazing W/Telescope & Camera" G. T. Keene

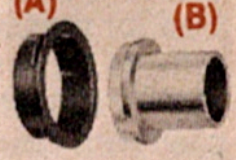
How to find celestial objects; select scopes & binoculars; make reflector; etc. Pprbk; 4-7/8 x 7-3/4" 128 pp.
No. 9350 $2.50 Ppd.

F/5.6 20" F. L. Telephoto Anastigmat Lens Set" In 5/69 "Sly & Telescope" aritcle on making a telescope-camera, aerial camera lens is 2 separate, mounted lens systems (front 4¾", rear 2-5/8" O. D.); spacing instr. **No. 70,188 $49.50 Ppd.**

Forty 35MM Slides Of Constellations

Set shows 40 Northern Hemisphere constellations, including fainter background stars usually omitted from plotted star maps. 5 seasonal & regional star map slides give consecutive views of sky as it appears to observer facing a certain direction at a certain time and date.
No. P-60,167 $16.00 Ppd.

Camera Adapters For Scopes



(A) Use your 35mm S.L.R. camera for prime focus astrophotography. All you need is one of our aluminum camera-to-telescope adapters and your "T" adapter (listed below under "B"). Adapters' metric thread connects one end to "T" adapter which connects to camera. 1-1/8" long parallel shank on other end fits in telescope eyepiece tube. Black anodized inside prevents unwanted reflections.

1-1/4" O.D. Adapter for standard American telescopes **No. 40,975 $7.00 Ppd.**

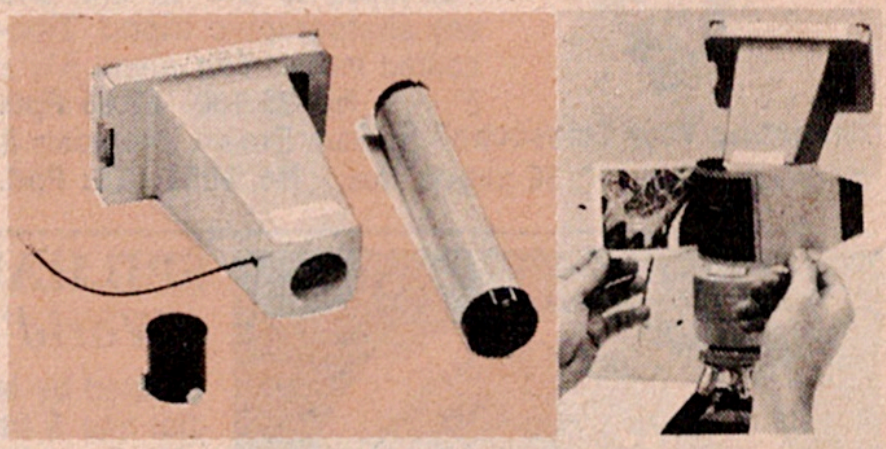
0.960" O.D. Adapter for Japanese telescopes **No. 41,121 $8.15 Ppd.**

(B) Camera Adapters. "T" compatible. Connect SLR cameras as listed to Telescope Adapters above.

Camera	Stock No.	Price Ppd.	Camera	Stock No.	Price Ppd.
Pentax	40,960	$5.50	Minolta	40,957	$7.70
Exacta	40,959	7.70	Nikon	40,956	7.70
Miranda	40,958	5.50	Canon	41,819	9.20

Other adapters? Write our Sales Eng. Dept.

Astro Camera . . . Tops For Microscopes Too!



The Polaroid® Instrument Camera lets you view a subject one instant and hold a quality picture of it the next! Color pictures develop in a minute, black & white in seconds. Ideal for astronomers, students, doctors, researchers—anyone using telescopes or microscopes in job or hobby. **Fits all standard eyepieces.** A universal adapter attaches to any eyepiece tube and the camera slides on over the adapter. **Easy to use.** Turn out perfect pictures in minutes. Frame subject on scope; attach focusing tube and focus; replace tube with camera; and make exposure. Pull film from camera to start development. Seconds later, peel off finished picture. No darkroom or messy chemicals! The 4½ x 7½ x 10" camera made of high impact plastic withstands rugged use. Uses regular Polaroid® Land pack film. Incl.: 10" cable release; 11½ x 2" dia. focusing tube; universal adapter; 52-page instr. booklet. **No. 1619 $71.95 Ppd.**

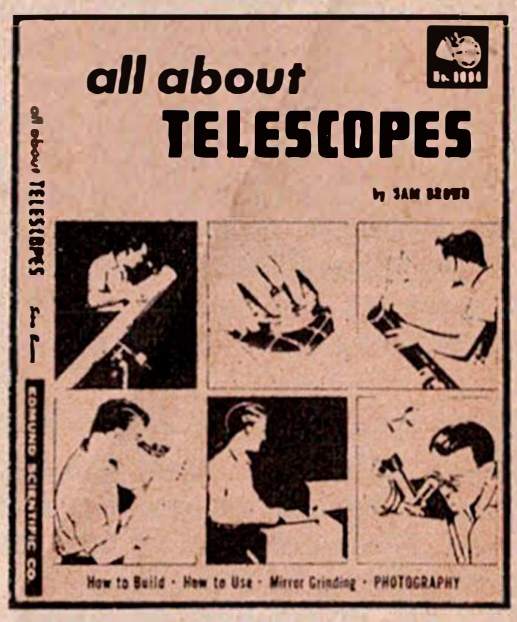
"All About Telescopes"—by Sam Brown

The Best Illustrated, Most Easily Understood Book About Telescopes and Astronomy

Whether you're a beginner looking for information and guidance about the type of telescope you should buy or build, or an advanced amateur seeking help in ray tracing or a formula to work out object-image sizes . . . YOU NEED THIS BOOK! Teachers and students can use it as a direct "step-by-step" text for all grade levels. Written in Sam Brown's easy-to-understand style, this informative book is one half text with the other half consisting of clear, how-to-do-it illustrations. It answers all practical questions on how to build and use every kind of telescope. Complex concepts are broken down into familiar terms. Every necessary topic is carefully explained; grinding, polishing, testing mirrors; mirror reflection and mounting; optical design; focal length, image object problems, home-made eyepieces, etc. It contains sections from Sam's books including: "Telescopes You Can Build," "How To Use Your Telescope," "Homebuilt Telescopes," "Telescope Optics," "Photography With Your Telescope," and "Time in Astronomy"; plus completely new material covering "Getting Acquainted With The Telescope," "Observing The Sky Show," "Collimation and Adjustment," index, etc. Available in both paper and case-bound library edition. Free library index card on request. 192 pages plus covers.

Paper Bound 8½x11" **No. 9094 $3.00 Ppd.**
Special Case-Bound Library Edition 8-7/8 x 11¼" **No. 9385 $6.75 Ppd.**

THE "BIBLE" ABOUT TELESCOPES



"Make Your Own" Telescope Books

"Homebuilt Telescopes," S. Brown. Shows how to make a reflector mirror accurate to millionths of an inch. Saves money and time with detailed instructions on grinding stand and stroke; forming, smoothing, and testing the curve; chamfering; polishing; correcting; parabolizing; telescope constr., etc. 36 pp. (8½x11").
No. 9066 75¢ Ppd.

"Telescopes You Can Build," S. Brown. Step-by-step, illustrated instr. for 27 scopes, and 10 accessories. 33X prismatic scope; 3, 4¼, & 6" reflectors; 3" low-cost, & baby refractors; 8-20X variable power scope, etc. 36 pp. (8½x11").
No. 9065 75¢ Ppd.

"Making Your Own Telescope," Thompson. An old standard for amateurs and a valuable addition to your telescope "know-how". Step-by-step coverage of mirror grinding, pitch lap, polishing, testing, correcting, the paraboloid, the diagonal, the finder, eyepieces, mounting, aluminizing, setting circles, optical principles, secondary reflections, etc. Cloth bound. 211 pp. (5¼ x 8½") 98 illus.
No. 9203 $4.00 Ppd.

"How To Make A Telescope," Texereau. Basic principles; making mirror, eyepiece, mechanical structure, altazimuth mounting, accessories, adjustments, telescope use, photography. Pprbk., 258 pp. (4-1/8 x 7-1/8") w/86 diagrams & illus.
No. 9355 $1.95 Ppd.

"Mounting Your Telescope," S. Brown. Discusses types of mounts, how to mount reflectors & refractors, setting circles, clock drives, slow motion controls, etc. Pprbnd, 36 pp. (8½ x 11).
No. 9082 75¢ Ppd.

"Telescope Optics," S. Brown. Covers focal length, image-object problems, ray tracing, homemade eyepieces, objectives (mirrors & lenses), etc. Tables, diagrams. Pprbnd, 32 pp. (8½ x 11").
No. 9074 60¢ Ppd.

"Amateur Telescope Making," Ingalls. Series of 3 clothbound books. Each chapter written by an expert. Symposium of articles on every subject connected with amateur telescope making. (ea. 5½ x 7½", illus.)

Book I **No. 9208 $5.00 Ppd.**
Complete data on telescope making incl. grinding your own mirror, testing and figuring, mountings, eyepieces, motor drives, observing, spectroscopes, celestial photography, etc. 510 pp.

Book II **No. 9209 $6.00 Ppd.**
More advanced information on construction of optical instruments, testing, small lens making, refracting telescope objectives and mounting, drives for larger scopes, Springfield mounting, etc. Incl. 125 pp. on observing. 650 pp.

Book III **No. 9224 $7.00 Ppd.**
Covers spectrographs, diffraction grating, Null test, optical flats, lens production, Barlow lens, lenses for astrophotography, Schmidt principle, etc. 646 pp.

MISCELLANEOUS ASTRONOMY TEXTS

50-Page "Atlas of Space," U. S. Naval Institute. 23 photos, 22 diagrams, moon map.
No. 9347 $1.25 Ppd.

"How To Use Your Telescope," S. Brown. Fine introduction to telescopes and the stars. **Learn about:** observing and comparing planets, finding sky objects, telescope arithmetic, astrophotography. Dawes limit, power, field of view, selection, light gathering power, and collimation; Barlow lenses; equatorial mounts; 32 pp. (8½ x 11").
No. 9055 60¢ Ppd.

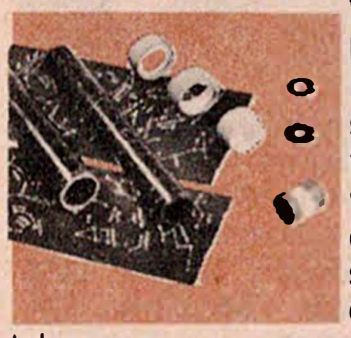
"Time In Astronomy," S. Brown. Covers Solar Time, Sidereal Time, Time around the world, position of a star, adjusting polar axis, finding sky objects using "star hopping" system, etc. Equatorial star chart, list of brightest stars; selected sky objects; tables. 36 pp. (8½ x 11").
No. 9054 75¢ Ppd.

"Celestial Objects for Common Telescopes." 2 volumes by T. W. Webb, revised by M. W. Mayall. Shows what to look for, how, where. Vol. 1 (255 pp.) on entire solar system (except Pluto and asteroids); Vol. 2 "The Stars", (351 pp.) largest and finest collection of data available about celestial objects for moderate-size telescopes. Both books illust., pprbk, (5-3/8 x 8").
No. 9349 $5.50 Ppd.

"Discover the Stars," Johnson & Adler. Beginner's guide to radio astronomy, navigation, solar energy, simple homemade instruments. Illust., ppbk. 130 pp.
No. 9225 $2.25 Ppd.

"Astronomy Made Simple," Degani. 192 pp. (8 x 10¾").
No. 9229 $1.95 Ppd.

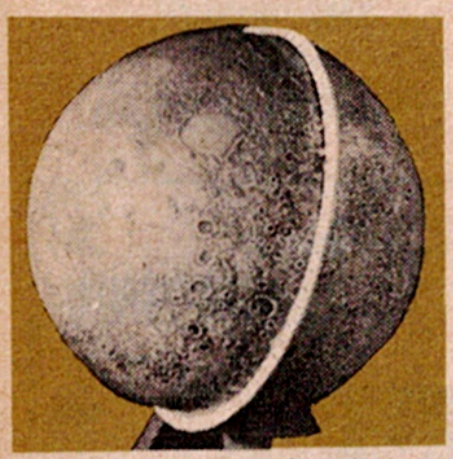
8X Refractor Telescope Kit



With this kit, even 8 yr. olds can build an attractive 8X telescope. Scope is powerful enough to show craters on the Moon, Jupiter's moons, and many stars not visible to the naked eye. Kit incl.: objective lens, eye lens, glare stops, kraftboard tubes, full instr., etc., to make an 18" long, 1¾" dia. telescope.
No. 71,473 $ 3.25 Ppd.
Pkg. of 10 Kits. **No. P-71,474 $23.50 Ppd.**

MOON

3-D Mini-Moon Model . . . Shows Both Sides!



A Touch of Space Decor
Same as one used in plaque given to astronauts by Pres. Nixon. 12" Mini-Moon shows in relief the space side (far side) as well as the Earth side of the Moon. American flag (in relief) marks Apollo 11 landing site. An educational item for home, school, etc. Degree scale & quadrant can be cut out & pasted around Moon. Wood base & fact-filled 16-pg. booklet incl.

No. 70,515 $14.50 Ppd.

Color And Black & White Moon Maps

48½ x 53½"; 3-D. Most detailed map of Moon ever printed. Over 200 names of oceans, peaks, etc. Separate index. Gives elevation of mts. and depth of craters. 4-color printing for 3-D effect. **No. 9380 $1.95 Ppd.**

35 x 46" Photo-Reproduced. B&W reproduction of Moon with named lunar features clearly marked, index, and other lunar facts. **No. 9297 95¢ Ppd.**

Lunar Atlas . . . Edited by Dinsmore Alter

Pictorial study of lunar landscape (facing Earth). Illus.; 10½ x 12¾"; 334pp; pprbk. **No. 9387 $6.00 Ppd.**

Tektites . . . from the Moon? Hard, somewhat brittle, look like dark brown, opaque glass.

One piece, approx. ½"	**No. 40,620**	**$1.50 Ppd.**
One piece, approx. ¾"	**No. 40,609**	**2.00 Ppd.**
One piece, 1" or more.	**No. 40,647**	**4.50 Ppd.**

Large (2" and over) Tektites. Some of the best specimens obtainable. **No. 40,888 each $20.00 Ppd.**

125 Stars That Glow In The Dark transform a ceiling or walls into a realistic night sky. Safe decals glow brightly after exposure to light. 125 stars up to 1" dia. Star chart and instr. incl. **No. 9298 $1.50 Ppd.**

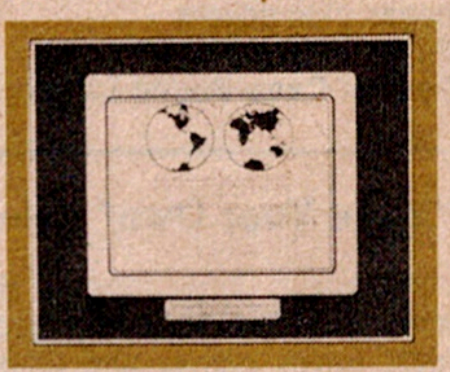
See Space Slides of the Moon and the Apollo Missions in the Educational Visual Aids Section, pages 22 & 23.

Apollo 11-16 Embroidered Patches

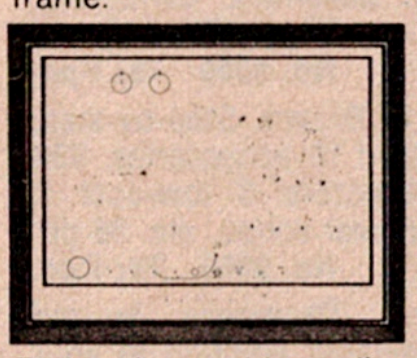
Artistically embroidered in striking colors, these colorfast, 4" dia. commemorative patches are authorized reproductions of official Apollo patches. Ideal as gifts or incentive awards, the symbolic emblem of each mission looks impressive on a jacket, in a frame, space flight collection . . . or save them as a souvenir of Man's greatest adventure. **$2.35 Ppd. Each.**

Apollo 11. Eagle touchdown	**No. 41,338**
Apollo 12. Clipper Ship.	**No. 41,339**
Apollo 13. "Sun Chariot."	**No. 41,340**
Apollo 14. Kitty Hawk.	**No. 41,487**
Apollo 15. Moon with 15 symbols.	**No. 41,488**
Apollo 16. Eagle on 16 shield.	**No. 41,733**
Apollo 17. The end of an era.	**No. 41,968**

Replicas of Apollo 11 & Pioneer 10 & 11 Plaques



Apollo 11. Plaque reads. "Here men from the planet Earth first set foot upon the Moon July 1969, A.D. We came in peace for all Mankind." Signed by the Astronauts: Armstrong, Collins, Aldrin, and by President Nixon. Identical to plaque now on the Moon. 5-11/16 x 6-15/16" polished steel plaque in frame. **No. 71,574 $7.25 Ppd.**



Pioneer 10 & 11. A memorial of the 1st manmade object to escape into interstellar space. Original (on spacecraft) is designed to show scientifically educated inhabitants of some other star system when it was launched, from where, and by what kind of beings. Etched in a gold-anodized alum. plate. 9 x 11" mounted. Interpretation incl. **No. 71,707 $8.25 Ppd.**

Terrestrial Telescopes

Deluxe Spotting Scope With Revolving Turret

15X, 20X, 30X, 40X . . . Big 80MM Objective. Imported!

Compares with models priced up to $30.00 more. Excellent 495mm F.L., 80mm hard-coated achromatic objective lens with light gathering power so great it picks out extremely faint objects under all lighting conditions! Shows stars to 11th magnitude! 4 parfocal eyepieces on revolving turret change at a flick of a finger.

Built-in, prismatic erecting system; body-mounted focusing ring with finger-tip control; vernier knob for positioning. Sunshade eliminates glare. Lens cover incl. Sturdy metal tripod adj. from 9 to 14". 9" extension post is chrome-plated. Folds for carrying, 4 lb. 4 oz. See table below. **No. 70,444 $139.50 Ppd.**

Magnification	**15X**	**20X**	**30X**	**40X**
Field at 1000 yds.	122'	98'	61'	49'
Dia. of exit pupils	5.4mm	4.0mm	2.7mm	2.0mm
Relative brightness	29	16	7	4

Inexpensive Vari-Scope 25X to 50X

For General Observation and Moon Watching
Exact image telescope has 40mm dia., coated, achromatic objective. Rack and pinion focusing. Enameled metal body with chromed draw tube measures 27¼" long (extended) and 24½" (closed). Supplied with 10" high, rubber-tipped tripod complete with yoke mount and locking screws. Lens caps incl. Field of view at 1000 yards: 25X, 60 ft.; 50X, 20 ft. Will focus down to 25 ft. Imported.

No. 71,053 $24.25 Ppd.

Z-o-o-m 13X To 40X

• 40mm Objective

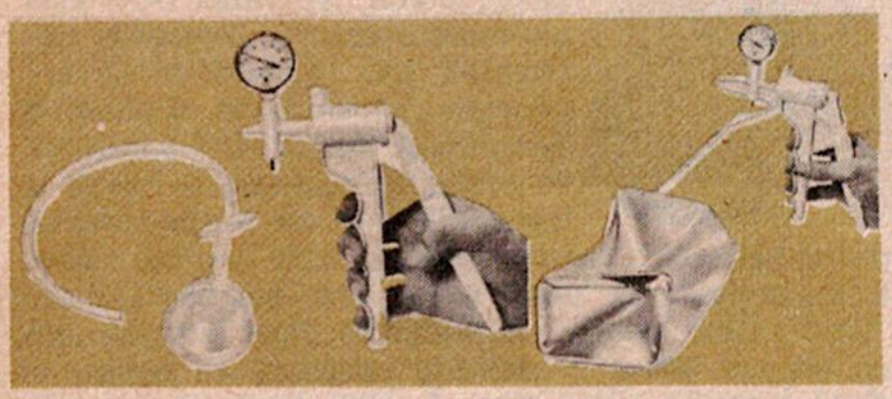
Reasonably priced, well finished, and fine for all terrestrial viewing. Zoom feature clearly enlarges distant objects for more detailed observation. Large, coated, 40mm achromatic objective has excellent light-gathering and resolution qualities. Field of view at 1000 yd: 13X, 141 ft.; 40X, 47 ft. The 16" long metal body carries both focusing barrel & zoom adj. Folding tripod stand, 9" high, has ball swivel mount with lock. Lens caps incl. 2 lb. 12 oz. Imported. **No. 71,054 $46.00 Ppd.**

HISTORY HAS BEEN MADE ON THE MOON.

EDUCATIONAL ITEMS

LOW-COST, HAND-HELD VACUUM PUMPS WITH GAUGE AND LIFTER

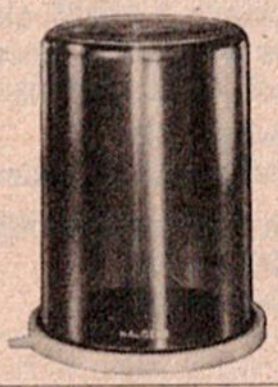
Produces a Vacuum Up to 25" of Mercury



This hand-held vacuum Pump (of high-impact plastic) comes with a 2-ft. length of ¼" clear plastic tubing that attaches to vessel you wish to evacuate. Just work the handle until the desired vacuum is attained . . . a 1-5/8" dia. gauge registers 0-30" of Mercury. (To release, just pull rubber tab.) You also get a 5" long, one-piece, polyethylene lifter that attaches to end of tube. The 2½" dia. cup firmly grips flat, non-porous surfaces as vacuum is created by pump. A must for school vacuum demonstrations (e.g., "Magdeburg hemispheres"), Science Fair Projects, etc. Many practical applications also: bleeding fluid lines; starting siphons, esp. for noxious chemicals (pump resists most acids and bases); evacuating air from bell jars, air chambers, etc.; vacuum packing; checking leaks in vacuum lines and instrumentation; cleaning aquariums in conjunction with a filter reservoir; evacuating air from epoxy castings; testing automotive vacuum-operated accessories; clearing stopped drains; etc. Over-all pump size: 7 x 4".

Pump w/accessories. **No. 71,301 $12.75 Ppd.**
Pump w/Tubing only. (no gauge) **No. 71,300 $6.50 Ppd.**
Set of 2 Lifters as above. **No. P-71,302 $2.85 Ppd.**

Complete Vacuum System



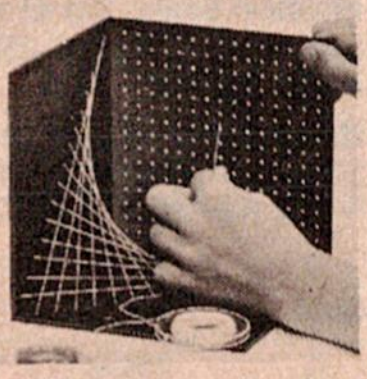
Clear bell jar (polycarbonate) & gasketed, polyethylene base w/permanent, fused-in, ¼" tubing connection. Withstands full vacuum. Ideal in labs. Jar: 9 x 6-3/8" I.D. Base: ½ x 7½" dia. Neoprene gasket: 3/32 x 7" dia. w/½" center hole. **No. 71,338 $24.25 Ppd.**

Probability Kit

Investigate and demonstrate the laws of probability and chance. This unusual kit includes actual working roulette wheel, slot machine, chuck-a-luck, cardboard cutouts for making two pairs of giant dice for demonstrations, a package of shot for probability board studies, and detailed instr. **No. 70,335 $6.85 Ppd.**

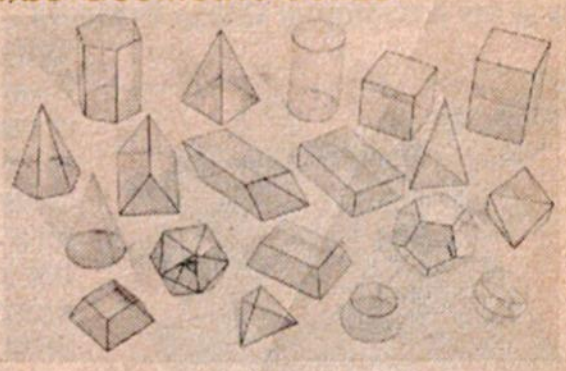
A wide variety of Educational Visual Aids can be found on pages 22 and 23.

Designs in 3 Dimensions With Space Spider



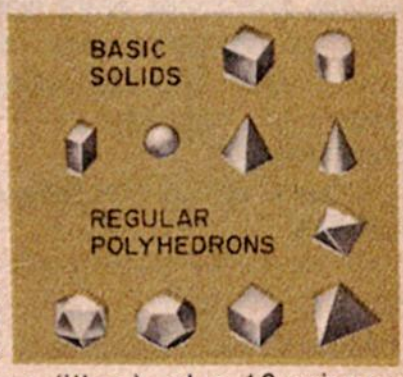
Designs that float in space made simply by weaving fluorescent strings thru different planes. Hours & hours of creative fun for adults or children. Light it with "black-light" & create a beautiful sight. 3 black notched wood panels (5½" sq. ea.); 3 reels fluorescent thread; black clips; needle; & instr. incl. **No. 70,278 S 5.00 Ppd.**
Set of 6 Space Spiders **No. P-70,297 $24.95 Ppd.**

19-Pc. Set of Jumbo Geometric Solids



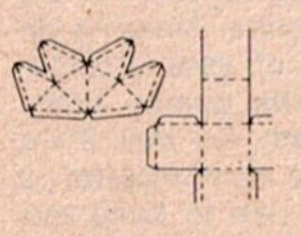
Economical demonstration set made of transparent plastic to better demonstrate angles & perspective. Edges outlined in red for good visibility. Surfaces easily marked with china marking pencil . . . put formulas right on the shape! Ht. of largest is 4-11/16" with others in proportion. 19 incl.: cube; reg. octahedron; rt. circular cone; rt. hexagonal prism; etc. Hardwood box. Imported. **No. 70,314 $60.00 Ppd.**

27 Miniature Geometric Solids



Solid orange plastic shapes take all the punishment a class of youngsters can give. Each piece measures approx. 5/8 to ¾" across its widest dimension and weighs from ¼ to ½ oz. Set incl.: 6 basic solids and 5 regular polyhedrons (illus.); plus 16 prisms, conics, and spheroids; and detailed instructions.
No. 70,615 $9.95 Ppd.

True Equal-Volume 6-Pc. Geometric Solids Set. Each plastic solid is a cubic inch, perfect for demonstrating equal volume by liquid displacement. 6 basic shapes: cube, pyramid, sphere, cone, rectangle, and cylinder. Instr. incl. **No. 60,250 $4.50 Ppd.**



Easy-To-Make Solids

12 cut-outs printed on card stock. Cut & fold to make 12 different geometric forms. Use as "blueprints," transferring directions to other materials.
No. 9062 $1.50 Ppd.

100 One-Inch, Colored Wood Cubes

Primary number grouping material. 25 blocks ea.: red, green, blue & orange. **No. 70,332 $3.80 Ppd.**

"Old-Fashioned" Computers

Authentic Japanese Soroban Abacus

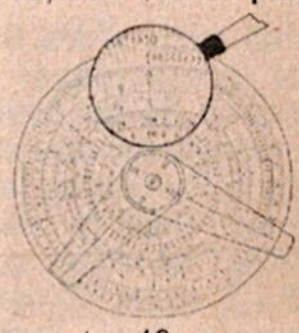
A 15-line abacus like those widely used in many Far East businesses. Proficient abacus operators can compete with modern office machines. Handy pocket size. Instr. incl. **No. 50,293 $3.75 Ppd.**

"The Japanese Abacus Explained." Over 300 diagrams. 5½ x 8½"; 240 pp.; pprbk. **No. 9370 $2.50 Ppd.**

Low-Cost Slide Rule

10" Mannheim Type Student Slide Rule. Designed for high school use. Precision construction of 1/8" thk. white plastic. Scales S, K, A, B, CI, C, D, L, & T engraved on face. Plain back. Lucite cursor, leatherette sheath, and instr. incl. **No. 30,379 $1.95 Ppd.**

Circular Slide Rules

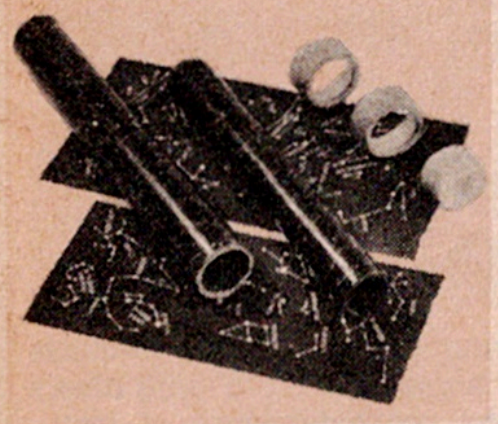


2-Sided (illus.). Easier than conventional "slip stick". 8 scales: C, C1, add & subtract, sq. root, log-log, binary, fraction & thread. 4¼" dia. Pouch & instr. incl.
No. 40,784 $7.25 Ppd.

Low-Cost Circular Rule. Multiply, divide, proportion, find sq. root, area, etc. 48 conversions. 6½" dia. plasticized cardboard.
One No. 40,364 $1.00 Ppd. Ten No. P-50,360 $7.50 Ppd.

8X REFRACTOR TELESCOPE KIT

Ideal for Astronomy Group Projects . . .

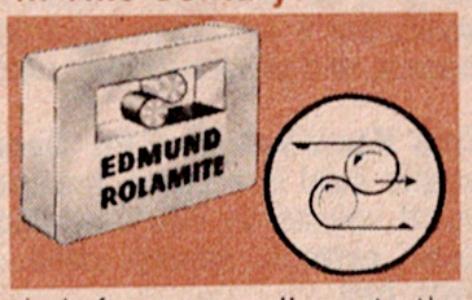


Only $2.35 ea. for 10

Every boy and girl dreams of taking part in the exploration of outer space. This desire makes building his or her own telescope a real thrill. With this kit, even 8 year olds can build an attractive 8X telescope. A practical group project for scouts, junior astronomy clubs, and similar groups. (Note special quantity prices!) Scope is powerful enough to show craters on the moon, Jupiter's moons, and many stars not visible to the naked eye. Kit includes objective lens, eye lens, glare stops, kraftboard tubes, etc., to make an 18" long. 1¾" dia. telescope. Full instr. incl.

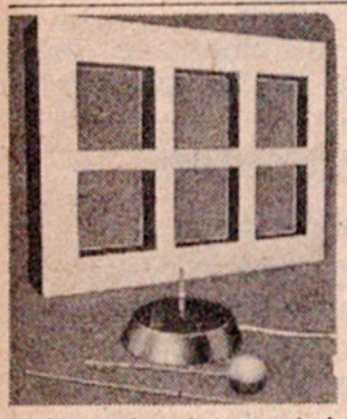
Complete Kit **No. 71,473 $3.25 Each Ppd.**
Teachers, Scout Leaders, etc.:
Ten Kits **No. P-71,474 $23.50 Ppd.**

Rolamite "Kit" . . . First "Elementary Mechanism" Invented In This Century!



As Important As The Pulley, Lever & Fulcrum

Rolamite consists of 2 rollers in a track with an S-shaped bank of springy material between them. When the rollers move, the band unwinds from one roller onto the other. Since the band and rollers move together at the same speed, there is relatively little friction. Amazing yet simple invention will have thousands of uses: frictionless bearings, in shock absorbers, valves, pumps, fuses, thermostats, brakes, thread gauges, etc. Kit incl. 3½ x 2¼ x ½" transparent plastic Rolamite demonstrator, 2 stainless steel rollers, 2 tracks, instr. Use to build various Rolamite assemblies and see many ways it functions. **No. 60,762 ONLY $5.95 Ppd.**



Low-Cost Ames Window

Perception vs. Reality

A rotating trapazoid you perceive as an oscillating rectangle! More than an optical illusion, this classic demonstrator tests your depth perception, visual acuity, and associative powers. Quiet, 4rpm, 115v AC motor (in 5¼" dia. metal base) rotates the 12¾ x 12¾" bristol board Ames Window. Accessories & instr. incl. Valuable tool for schools, artists, psychology majors, etc.! 5-ft. cord. **No. 71,340 $12.00 Ppd.**

Battery-Powered Ames Window. 8¼ x 7¼" window on 7-5/8 x 2" metal base with accessories & instr. ("D" battery not incl.) **No. 71,341 $6.00 Ppd.**

Beautiful Slides in Minutes From Magazines

No cameras, machines, or chemicals!

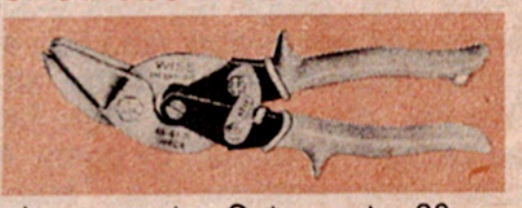
Full color slides from pictures out of coated-paper magazines or books. Slides have good detail & cost just pennies ea. Any child can do it! Processing takes 2 min. using water. Great for classrooms! Quick-Slide® Kit makes up to 20, standard 2 x 2" slides. 10 mounts, viewfinder, special "film", burnisher, sponge & instr. **No. 41,794 $4.25 Ppd.**

Deluxe Kit for 75 Slides. **No. 41,793 $13.75 Ppd.**

Low-Priced Cartesian Diver

Easy to use! Just add water & it's ready to go. Fascinating classroom demonstrator. Operates from simple hand pressure. Descartes discovered the "Cartesian Diver" principle (transmission of pressure by a liquid). Water can't compress, so pressure applied to bottle is transmitted to air bubble inside diving bell which can compress. Bubble is smaller now, & less buoyant, so "diver" sinks. Also illus. how fish can "float". Claw mechanism added to diver lets you pick up objects. When pressure is released, air bubble in diver expands, claws close & diver floats to top with object. Plastic bottle, base, sand, diving bell, fishing items, & instr. **No. 71,570 $5.25 Ppd.**

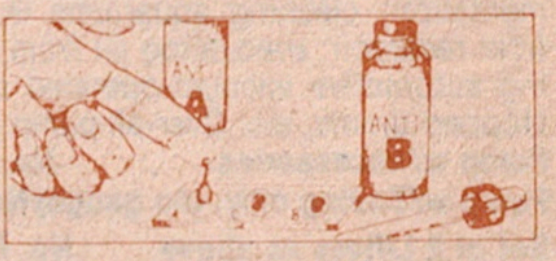
Heavy-Duty Snips For Cardboard Crafts



Compound "double lever" action gives exceptional power . . . perfect for classroom use to cut corrugated boxes for tables, houses, etc. Cuts up to 20-ga. with little effort. Extra sharp, piercing tip for easy starts; spreading action for fast, clean cutting; offset handles; extra-long finger grips; lightweight.

No. 71,659 $8.75 Ppd.

What's Your Blood Type?



Easily determine blood type in minutes in 5 simple steps. Ideal kit for science & health classes! 5ml anti-A & anti-B sera; sterile disposable lancets & alcohol pads; worksheet; instr. incl. Adult supervision required.

75-Test Kit **No. 71,725 $10.95 Ppd.**
10-Test Kit W/Slides **No. 41,812 $4.75 Ppd.**

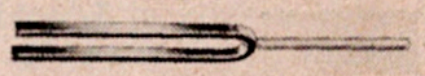
Rh Positive Test Kits . . . 3 min. test.
75-Test Kit **No. 71,726 $12.75 Ppd.**
10-Test Kit **No. 41,813 $5.00 Ppd.**

Drug & Narcotic Identification Kits

Identify & prevent accidental use of harmful & illegal drugs! Scientifically accepted color-producing reactions occur within one min. after adding test chemicals. Used by law enforcement agencies worldwide. Easily completed in less than 5 min. Require no specific training. Each has materials for 30-50 tests & instr. **$5.95 Ppd. Ea.**

Marijuana & Hashish No. 71,615 LSD No. 71,616 Barbituates No. 71,618 Amphetamines & Opiates No. 71,617

High Quality Tuning Forks



Physical Scale. Set of 10; chr. pltd. steel. Incl. 100 vps (sci. work), C-128, C-256, D-288, E-320, F-341.3, G-384, A-426.7, B-480, C-512. **No. P-50,338 $28.00 Ppd.**

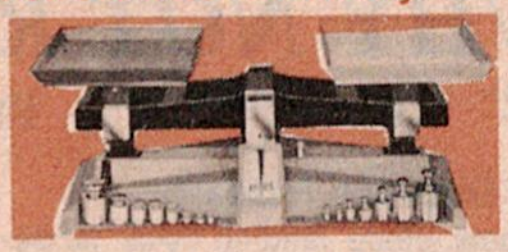
Mixed Set of 8; chr. pltd. steel. Physical: A-426.7, C-512; International: A-435, A#-460.9, C-517.3, Concert: A-440, A#-466.2, C-523.3. **No. 50,340 $13.00 Ppd.**

Single, Aluminum Tuning Forks.

Note	V.P.S.	Scale	Stock No.	Price Ppd.
C	256.0	Phys.	40,935	$5.25
A	440.0	Conc.	40,938	7.25
C	512.0	Phys.	40,939	5.40
	1,000.00	Phys.	40,940	8.10

EDUCATIONAL VISUAL AIDS ARE ON PAGES 22 & 23.

Low-Cost Balance For Schools & Industry



Rugged
2 Sets of Weights (Metric & Avoirdupois)
2,000 g. Capacity
0.5 g. Sensitivity

Designed to withstand the rough handling and hard use often given to balances in classrooms and labs. Has rugged, die-cast zinc base; strong, reinforced aluminum beam; and hardened-steel knife edges supported by self-aligning steel bearings. Its easily visible indicator is recessed for protection. Also has a zero adjustment wheel plus a manual damping device that saves you time. Its removable, high-impact polystyrene pans are color-coded and have corners that serve as pouring spouts. Balance has a 2,000 g. capacity and a 0.5 g. sensitivity. Includes instructions and 2 sets of weights . . . 15 in all: Avoirdupois—(two) 1/16, 1/8, ¼, ½, 1, and 2 oz.; Metric—1, (two) 2, 5, (two) 10, 20, and 50 grams. All weights are marked. Metric weights are bottle shaped and avoirdupois are knob shaped to prevent mix-ups. Weights conveniently store on ledge of base. A real value. **No. 71,168 $22.75 Ppd.**

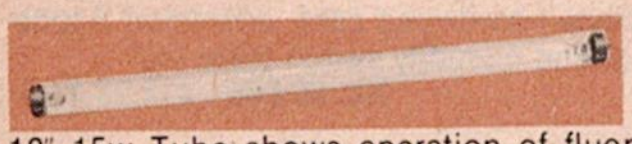
Metric Triple Beam Balance

A sturdy balance for industrial, research, and school use. Quick, easy operation; magnetically damped; insensitive to out-of-level conditions; and has end-reading device that eliminates parallax error. Tiered beams for easy reading: 0-100g.; 0-500g.; and 0-10g. Sensitivity: 0.1g. Capacity 610 grams. Overall size: 6 x 6 x 18"; 6" stainless steel platform. Instr. incl. **No. 71,695 $34.00 Ppd.**
Expand Above Capacity to 2610 Grams. One 500g. weight and two 1000g. weights. **No. 41,766 $8.25 Ppd.**

Low-Priced Gram/Ounce Scale

Unusually accurate for an instrument in this price range. Particularly valuable for home experiments. Scale is made of polished stainless steel & alum. Calibrated: 0-16 oz. (0.5 sub-div.): 0-450 g. (10 sub-div.). 2¾" dia. weighing tray. Height: 6".
No. 90,053 $7.00 Ppd.

Clear Fluorescent Tube—No Fluorescent Coating!

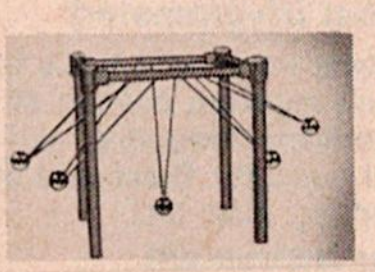


Low-Cost Lamp For Use With Optical Flats

18" 15w Tube shows operation of fluorescent lighting. Provides low-pressure mercury arc for use in fluorescent fixtures. Bright-line spectrum has strong lines at 4046 Å (violet), 4358 Å (green), 5770 Å and 5790 Å (yellow). Fine for calibrating spectroscopes, classroom, & in place of monochromatic light with optical flats.
No. 60,856 $3.00 Ppd.

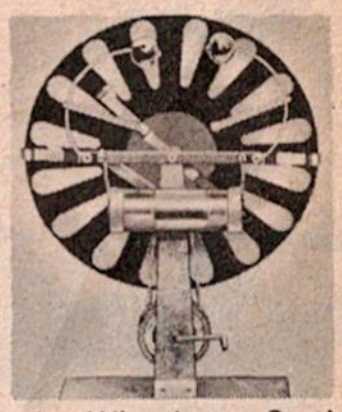
Modern Lamp For Above 15w, gooseneck, diffuser, 15½" h. x 18" w. **No. 71,435 $12.50 Ppd.**

Fascinating Action-Reaction Demonstrator



Shows Newton's 3rd Law of Motion, "To every action, there is an equal and opposite reaction." 8½" high, wood frame with 5 polished-steel balls suspended on strong double strings. Lift 1, 2, or more of the balls away from the others and let them go . . . they strike the other balls which then, in turn, swing out and return to strike the original balls starting the same process all over again. **No. 71,133 $5.95 Ppd.**

Edmund's Famous Electrostatic Generator



An electrostatic generator coupled with ion acceleration may provide the propulsion system when man goes beyond the near planets to the outer reaches of the solar system.

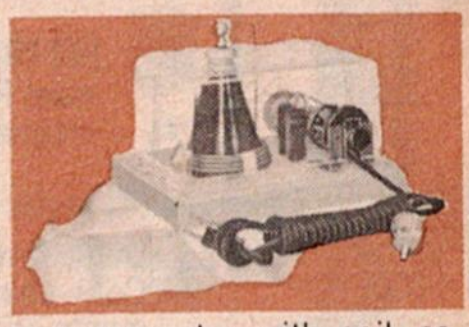
At educational conventions, many science teachers have told us this model is more rugged than bigger $50 units. High priced versions have been used in schools for decades. Known as the Wimshurst Static Machine, or Influence Machine, it can be used for many experiments.

Turn the handle and the two 9", plastic discs rotate in opposite directions. Metal collector brushes store static electricity in the Leyden jar condenser till discharged. Can generate up to approx. 75,000 v. Includes discharger, 2 luminous plates, jingle bell, dancing balls, lightning rod, 2 electric whirls, 14" high. Instructions.
No. 70,070 $19.50 Ppd.

Van de Graaff-Type Electrostatic Generator

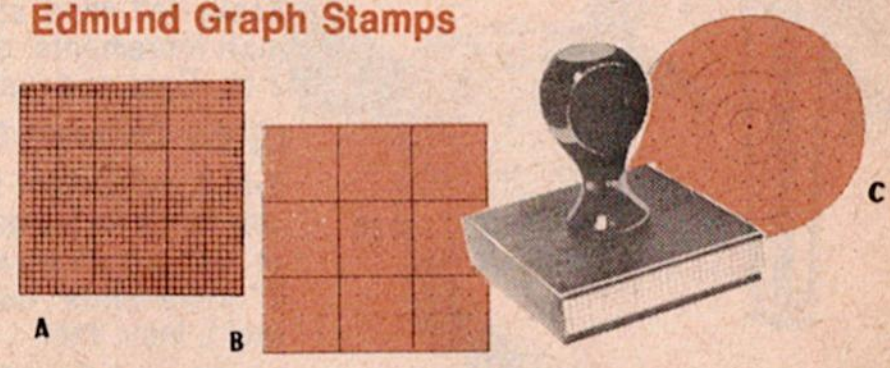
Demonstrate lightning, lightning rods, St. Elmo's fire, repulsion of like charges, electrostatic dust collections, the classic "hair-raising" demonstration, and flow of ions. 110v AC. Humidity range 0 to 90%. Up to 200,000.v. Current: 1.5 to 2.5 microamp. Base, housing, frame, and charge collector are aluminum. Insulating column is unbreakable plastic. Ht: 17"; 6¾" dia. With suggested experiments and instructions. **No. 70,264 $59.95 Ppd.**
Extra Band to power Generator. **No. 42,012 $1.00 Ppd.**

Tesla Coil Fun



Radiates high frequency energy through space . . . lights fluorescent tube 2 ft. away! Socket for standard bulbs enables you to connect these or similar radiator on top of coil. High-frequency generator with coil, capacitors and transformer has ball electrode, insulative base, protective plastic cover and cord. With small neon lamp, discharge electrode, 2 radiation antenna plates. 16-pg. instr. booklet includes 21 experiments. Generates 15,000 volts. 110v, 60 Hz. 8½ x 6½ x 6½".
No. 70,301 $51.50 Ppd.

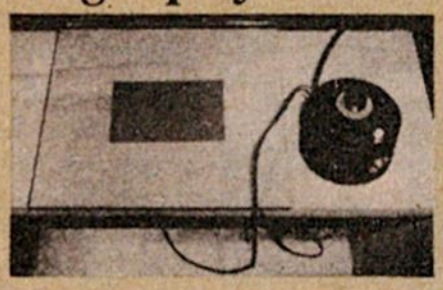
Edmund Graph Stamps

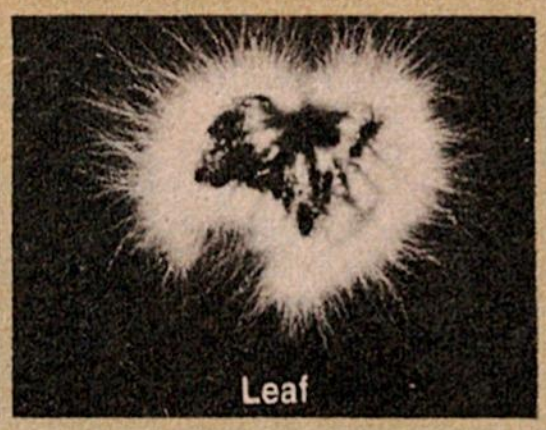


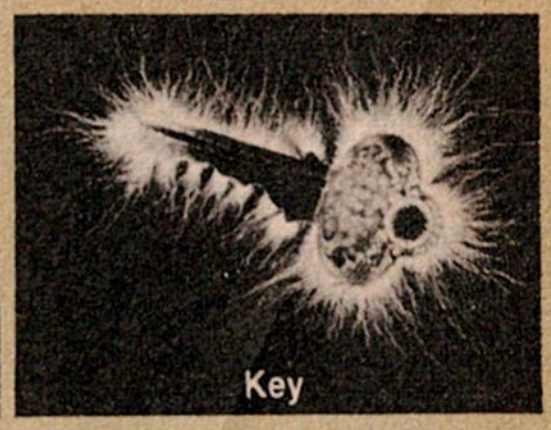
A) 100 Blocks Per Square Inch. Ideal for teachers & electronic design engineers. Full pattern: 3" sq. 1/10" blocks. **No. 50,255 $3.50 Ppd.**
B) 16 Blocks Per Square Inch. Used for plotting in larger scale than above stamp. Full pattern: 3" sq. ¼" blocks. **No. 50,351 $3.00 Ppd.**
C) Polar Coordinate Graph Stamp. For curve tracing, loci problems, etc. 3" dia. circle with divisions at 15° and 5°. **No. 50,359 $3.00 Ppd.**
Large Ink Pad. 3¼ x 6¼". **No. 60,134 $1.75 Ppd.**
Set. A, B, & C plus pad. **No. 70,475 $10.00 Ppd.**

"Kirlian" Electrophotography Kit

- Photograph "life energy forces"
- Color and black & white
- Quick, easy, low-priced
- New art form







• Research, experiment, and take amazing electrophotos!

Discover for yourself the fascinating world of "Kirlian" photography with the "Kirlian" Photography Research Kit. We've been reading some astounding things about "Kirlian" photography, taken some amazing electrophotographs, and developed this low-priced kit. Named after a Russian engineering team, this method of electrophotography uses a process where film is exposed to a high frequency electrostatic AC field that is rich in harmonic overtones. Now you can measure changes in "bioplasmic" states. Record your own corona discharge photographs of organic and inorganic objects. Determine the dielectric resistance and physiochemical reaction in living specimens. The electrophotographic image makes visible the "bioplasma" as it relates to a particular condition at a particular moment in time. A whole new untapped photographic field is now possible. Kit includes: (1) a variable low-voltage transformer (worth over $25 alone); (2) a high-voltage, high-frequency induction coil; (3) a metal electrode; (4) photographic changing bag; (5) all necessary leads; (6) glass plate; (7) complete instructions. Not for use by children.

No. 71,938 $49.95 Ppd.

New "Kirlian" Book . . .

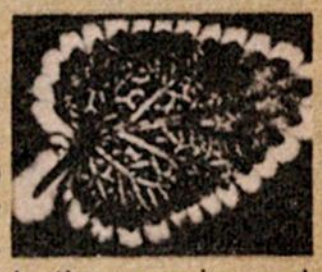
"Galaxies Of Life" . . . by Krippner & Rubin

Explains the mysteries of human aura in acupuncture and "Kirlian" photography. Everything from corona discharge pictures on life energy patterns, to detection of acupuncture points by the biometer. Loaded with color electrophotographs of organic and inorganic materials. A must for the "Kirlian" and acupuncture enthusiasts. Illus.; 182 pp; 6 x 9"; pprbk.

No. 9461 $6.95 Ppd.

See "Life Energy Patterns"

Kirlian Photography Slides



If what we saw on these slides is true, a whole new world of photography has opened. Here are 20 incredible color slides that show "life energy patterns" or "bioplasmic" changes as they occur in both organic and inorganic materials. Subjects are: fingers, thumbs, leaf, ring, and coin. Before and after shots show "aura" changes after "psychics" have imparted their energy forces to various objects. Taken with equipment similar to Edmund's No. 71,938 Kirlian Photography Kit, these slides represent the work of several electrophotographic scientists, all leaders in the field. Pkg. of 20 & instr.

No. P-42,116 $10.00 Ppd.

Build Your Own Solar Powered Radio!

- Solid State
- Solar Cell Power Source
- Ferrite Antenna

Harness the sun with this exciting solid-state solar radio kit. A selenium photocell gathers energy from sunlight and converts it into electricity to power the radio. A large tuning dial is supplied for easy station selection in the 550-1600 KH_Z range. A flick of the dual-mode selection switch allows the user to change from solar power in daylight to battery power at night. Step-by-step instr. let you build a working breadboard unit, arrange on a metal chassis, and install into an attractive plastic case, featuring a storage compartment for antenna wire and earphone. All necessary parts, fittings, breadboard materials, solar cell, even solder incl. Runs at night on 1½v AA battery (not incl.). Reception best on local broadcasts and in metropolitan areas. Cabinet: 4⅛ x 4⅛ x 2"; weight 2 lb.

No. 42,115 $10.95 Ppd.

Ever See A Quarter Jump 4 Feet?

New Edmund Quarter Jumping Discs

All of our customers loved the famous Edmund Jumping Disc so much, we've decided to make one that's even more fun. Here's a jumping disc that looks like a U.S. quarter. Place down on the table and it takes off . . . up to 5 feet in the air. Think of the fun you can have leaving tips that blastoff, making wagers on money that flies, or how about a coin that flips itself. You get a package of 6 head discs and 6 tail discs all for only $2.00. As a bonus, we'll even throw in 2 Edmund Scientific Co. jumping discs and instr. at no extra charge. Get jumpin' with flying quarters.

No. 42,099 $2.00 Ppd.

Deluxe Plastics Fabrication Kit

• OSHA Safety • Product Design

• Do-it-yourselfers

Design and make your own safety enclosures to meet OSHA safety regulations. Occupational Health and Safety Act of 1970 states in part, "To protect the operator . . . in machine area from hazards such as those created by . . . rotating parts . . . flying chips . . . guards shall be affixed to machines . . ." Now you can cut, drill, glue, bend, clean, polish & remove scratches from plexiglas, acrylite, lucite, and other acrylic materials with tools and accessories in one kit. You get a plastic polishing and scratch removal kit, plastrip heater, ⅛ and ¼" plastic drills, plastic cement, solvent applicator, plastic cleaner, plasticutter knife, and a fabrication manual loaded with instructions on working with sheet plastic. Restore clarity of plastic windows, shields, glasses, dial faces, furniture. Professionally fabricate plastic and save money. Manual incl.

No. 71,935 $19.95 Ppd.

Build Yourself A Greenhouse!

It's easy! You can have a 6 x 4 x 7½ ft. tall greenhouse in less than one hour. Extruded styrene plastic tubes snap together in minutes without a nail, screw, or tool required. This unshatterable Greenhouse is wind resistant, ultraviolet shielded, and has a tough 12 gauge "windowgleam" vinyl for a totally controlled environment at −30 to +130°F. Over 160 cubic feet for growing flowers and vegetables, starting bushes and trees, or raising orchids and herbs. It's light enough to move around . . . no special foundation or floor needed. Any tear can be repaired with glue or heat-sealed. Grow all year round by simply adding heat, cooling, or humidity as the plants require. 2 fiberglass work benches and instr. incl.

No. 19,188 $125.00 Ppd.*

***Price includes packing and prepaid postage.**

Terrarium Plant Food

Now you can make sure your terrarium flourishes! This slow release plant food supplies the feeding requirements of plants in terrariums for nitrogen, phosphorus and potash. One feeding lasts up to 12 months! Doesn't melt away like ordinary plant foods . . . feeds plants safely and continuously to help them grow steadily and strongly. Two 4 oz. packages. **No. P-42,113 $2.00 Ppd.**

Forecast Inclement Weather

Antique Weather Barometer—Really Works!

- **An unusual conversation piece**

Hand-blown replica of Cape Cod barometer used on sailing ships and whalers over 100 years ago. Scientifically designed so that it indicates changes in atmospheric pressure, thereby forecasting probable weather changes. Hangs on wall on black metal stand. An excellent addition for any weather prognosticator. **No. 71,948 $6.50 Ppd.**

Instant Brush-On Electroplating Kit

Make rusted, worn bumpers, grillework, all chrome shine like new again. Renew plumbing fixtures, tableware, medical instruments, cutlery, tools of all kinds . . . 1000's of possible applications. Enough chromelike material to plate 2 auto bumpers. Here's what you get . . . electrobrush with metal anode; plating solution; complete set of battery leads with electrical leads and heavy-duty clamps for battery hook up; special buffing wheel; buffing compound; special metal polish; special grinding wheel. Simple instr. incl. Uses any 12v battery or battery charger. Wt. 3 lb. **No. 71,950 $23.00 Ppd.**

Additional Electroplating Kits, see page 6.

"Magnets . . . The Education of a Physicist." Dr. Bitter gives a wealth of information on magnetism. Pprbk; 4½ x 7"; 155 pp. **No. 9279 $1.25 Ppd.**

More Growing Items, see pages 44-48.
Treasure Hunting Equipment, see pages 40-41.

Improved Gold Pan . . . With Gold Trap

Save that fine gold you've been losing! Pan either wet or dry . . . the gold trap insert traps and holds nuggets of gold or platinum while rocks & pebbles are kept out. The patented angle of the sides makes it easier to pan off black sand. Pan dia.: 17"; trap dia.: 8½"; trap depth: 3/8". All steel. Instr. incl. **No. 71,945 $8.00 Ppd.**

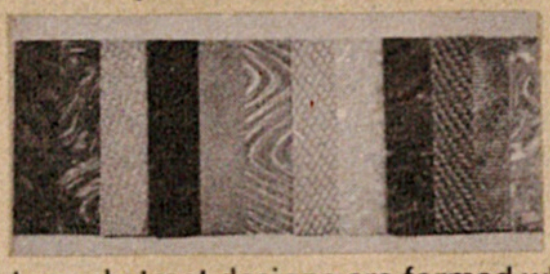
Trick Photography Splitter

- **Create 2 you's**
- **Split your personality**

Just snap Splitter on your Polaroid® Land Camera (Series 100, 200, 300, 400) and you're ready to take double exposures. Shake hands with yourself, combine a front & back to get a coming & going shot, let your imagination run wild! It's easy! Take one exposure, then switch cover to other side for second.

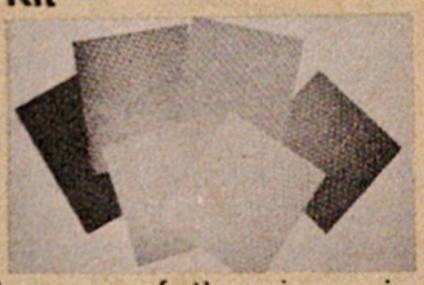
No. 42,110 $2.00 Ppd.

Create Unlimited Designs A-V Experimenter's Kit



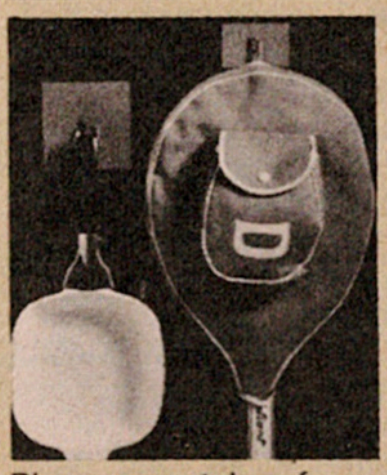
Great for kinetic art. Due to its 3-dimensional effect, objects placed on the multi-lens sheeting material appear to float. Patterns, letters, abstract designs are formed when the lenses on one side are displaced slightly in relation to lenses on the opposite side. Great in overhead or slide projectors . . . ideal for craftsmen, painters, teachers, or anyone bent toward the abstract. 12 sheets of colored translucent and opaque multi-lens sheeting material (8½ x 11") and instr. incl. Wt. 5 oz. **No. 71,947 $13.95 Ppd.**

Dimensional Black Light Kit



Create startling 3-D posters that glow in black light. Each square inch of plastic material contains 10,000 or more minute parabolic lenses. Through an oriented pattern of absorption and reflection, they return light rays to the eye of the viewer in shimmering moiré and satin effects, or in modular honeycomb patterns. Create sinking or floating pictures. Great for set designers, artists, ad agencies, experimenters, product display. 6 colored sheets (8½ x 8½").

No. 71,946 $4.95 Ppd.



Magnetic Wall Hangers

Great for hanging pictures, charts, display materials. Handy magnetic plates covered on one side with rubberized (won't scratch) magnetic backing, and actually contain 8 separate magnetic fields per inch. Pkg. of 3 hangers that hold 2.5 lb., 10 lb., 20 lb. on any cabinet, refrigerator or metal office partition. No holes, no drilling. Place on metal surface and attach picture. Thousands in use in government office buildings.

No. 42,096 $6.50 Ppd.

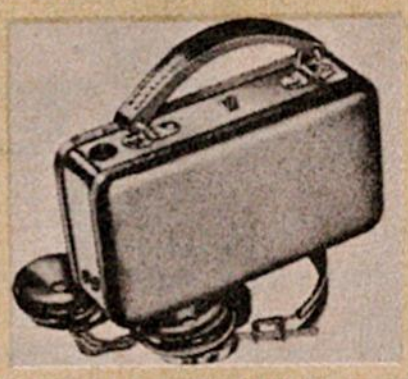
For a complete selection of Magnets see pages 34-36.

THE ITEMS ON THIS PAGE ARE NOT IN INDEX.

Discover Uranium!

. . . With This Portable Geiger Counter

• Solid State Design
• Perfect for Radioactivity Experiments



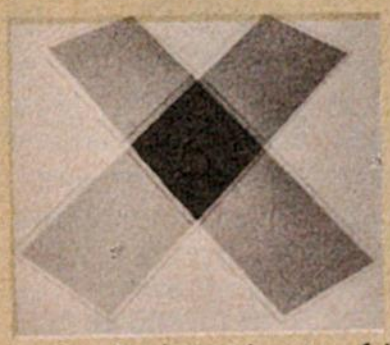
This rugged metal indicator is the perfect companion for ambitious treasure hunters. It positively indicates uranium and other radioactive substances through a visual neon light and sensitive headphones (incl.) A double protected, metal encased Geiger-Muller tube makes it safe for classroom use, too. So easy to use, there's only one operating control (On-Off switch). For field trips and lab study, the unit quickly shows absorption capabilities of different materials, such as iron, lead, wood, etc. Runs for hours on 3 "AA" batteries (incl.) and weighs a mere 3 lbs. Also includes a radioactive source (.1 microcurie strontium 90) to demonstrate radioactivity and the shielding power of various materials. 7½ x 4 x 2½". **No. 1939 $79.95 Ppd.**

Long Range Professional Geiger Counter

• Locate uranium & other radioactive substances
• Great for hospital and laboratory use

This lightweight (3.5 lb.) Geiger Counter is ideal for any professional needing to detect amount of radioactivity. The splash-proof, shockproof, 2-piece aluminum case makes it perfect for laboratory use . . . it's only 4⅞ x 8¼ x 6½" high, so it requires little storage space. The external geiger tube (with flexible cable) detects Alpha, Beta, and Gamma radiation. Ranges: 0-20, 0 2, 0-0.2 mR/hr. Regulated high and low voltage insures stable, dependable results. Accuracy: ±20% of full scale on all ranges. 4 "D" size batteries are included for over 200 hours of continuous service. Controls are simple to operate: 4-position range selector switch and push-button battery test switch. Instr. incl. **No. 19,187 $299.95 Ppd.**

High Quality Polarizing Material . . . At Surplus Prices!

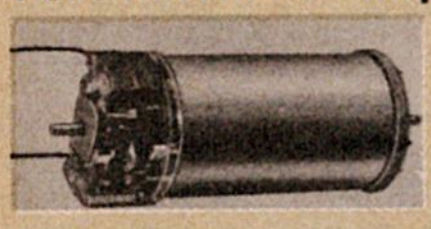


This is the finest quality Polarizing Material rejects we've ever come across! Originally used for manufacturing sunglasses, each sheet is a factory second with only minute imperfections . . . offered at a fraction of their normal price. Sandwiched between 2 clear sheets of butyrate plastic (only .030" thk.), it is rigid, easily cut with scissors. Transmission: 23-25%; polarizing efficiency: over 99%. Resistant to fading and delamination, with dozens of uses: large photo light filters, polariscopes, polarizing slide effects, no-glare camera filters, teaching, microscopy, etc. Quality is so fine, you might even use it for small production runs, and possible O.E.M.'s Each sheet is 10 x 24".

No.	Price Ppd.	Color	No. of Sheets
71,939	$ 6.00	Gray	1
P-71,940	11.00	Gray	2
P-71,941	50.00	Gray	10
71,942	6.00	Brown	1
P-71,943	11.00	Brown	2
P-71,944	50.00	Brown	10

Polarizing Slides and Projectors, see page 114.
Surplus Polarizing Material, see page 159.

Distler Motors . . . Surplus Bargain



The last available of this unique, highly efficient, miniature ball bearing motor! We have purchased the entire stock of this smooth running 1½ to 3 volt DC motor. Use it for hobby projects, models, displays, etc. Built by European craftsman, this super efficient, low inertia design features sintered graphite-copper brushes which minimize frictional drag on commutator and a unique inside-out construction with the permanent magnetic field placed inside the armature coils. Tops for use with solar cells, DC Servo Systems, etc. Metal housing: 2¼ x 1" dia. with transparent plastic brush cover. Double ended shaft, .083" dia., extends ¼" from each end. **No. 40,902 $4.95 Ppd.**

Surplus Motors at bargain prices . . . see page 131!

Parachute Canopy . . . for Phys. Ed. Classes!

• Even use as a small car cover

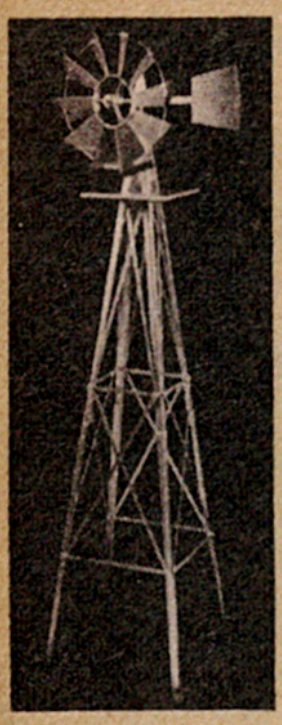
Parachute play is an exciting new development in elementary physical education. One parachute is sufficient for a class of 30 children to gain strength, agility, coordination, endurance, flexibility and have healthful fun at the same time. Upper body development is especially aided with parachute exercises . . . indoors or out. They're also useful as small car covers, canopies for dances, etc. Brand new surplus parachute without bothersome cords. All white rayon for great durability. (16) 1 ft. panels. Parachute exercise instr. incl. **No. 71,897 $19.95 Ppd.**

Space Hop . . . A Game of the Planets

An exciting astronomical game for 2-4 players that's fun to play at home or school . . . and also educational. Developed by teachers, Space Hop teaches players about the sun and its planets, moons, comets, and asteroids. Each person takes a rocketship and draws a "Mission" card describing his destination without naming it. If the player recognizes his objective he rolls the dice and proceeds immediately through space "hazards". If not, he loses a turn and consults a Decoder. Full color 22 x 22" board, materials, and instr. For age 9 and up. **No. 71,937 $13.95 Ppd.**

"Guideposts to the Stars" by Leslie C. Peltier

A great way to learn about the stars . . . written especially for young readers. The 15 brightest stars seen from the middle northern latitudes are used to point the way to all their neighbor stars and constellations. A step-by-step guide that's entertaining & informative. Illus.; 176pp; 7 x 9"; hrdbk. **No. 9460 $6.95 Ppd.**



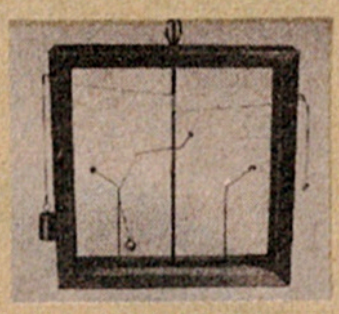
Windmills . . .

Enhance Your Lawn And Garden

Let the wind blow and watch them go . . . spinning smoothly and quietly on quality ball bearings. Each is an authentic, built-to-scale replica of the real thing. Indicates weather direction too. You and your friends will love the "rural charm" a windmill adds to your grounds. Great as a centerpiece for a planter or flower, for holding yard lights, house numbers, or mail box. Some even say vibrations transmitted to ground keep lawn mole-free. An answer to the "energy crisis"? Well, hardly, due to the difficulty of adapting them to a generator or a pump, but if you're handy who knows? 3 sizes for any particular situation. Wheel dia. to 22" on 8 ft. size; 12" on 4½ ft. size; 5" on 17" size. Heavy gauge steel construction on all models. Durable outdoor finish, aluminum color with red trim. Includes metal ground-anchor stakes and assembly instructions.

4½ ft. size (14 lb.) No. 71,924 $32.50 Ppd.
8 ft. size (46 lb.) No. 85,229 $44.95 T.C.C.
17 in. size (desk model in/out use) No. 71,923 $10.95 Ppd.

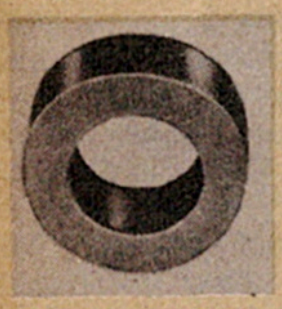
Preposterous Pendulum To Peacefully Ponder

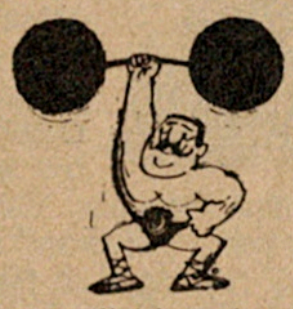


Originally invented in the 1800's as an escape mechanism for a clock movement, the originator of this pendulum was not aware that this exact timing device could someday be used as a tension eliminator and conversation piece. Placing the weight on the outer ring causes the energy transfer line to turn the axle which rotates the rod that swings the ball that winds around the posts . . . first in one direction, then the other, until the weight reaches the bottom. To start the flying pendulum swinging again, hook the weight to the other ring. You'll enjoy this new found friend and spend delightful hours watching it do its thing. 11 x 11½", wood and metal construction. Instructions incl.

No. 71,904 $9.95 Ppd.

World's Strongest Magnet?
Lifts 64 times Its Own Weight!





Introducing Super Magnet with 100 times the pull of a similar Alnico of equal size and shape. Possibly the strongest magnet available today. Having an amazing 7,000 gauss pull, Super Magnet is essential in applications where extreme magnetic strength is needed and light weight and small size are critical factors. Capable of lifting 50 to 75X its own weight, this tiny giant can open the door to product designs never before possible. Made especially for us by Crucible Magnetics from rare earth samarium cobalt materials, it offers a one-of-a-kind superiority to all magnets presently available. Expensive? Not really, when you consider its unbelievable lifting and holding power. Size: .750 ± .015" OD x .430 ± .015" ID x .250" thick; wt: 1½ oz; gauss: 7,000; lifting power: approx. 6 lb. **No. 30,730 $15.00 Ppd.**

Strike It Rich? Gold Panning Kit

Eureka! Get started in this profitable outdoor hobby with the right equipment. It's fun and easy. Takes just a little patience and a lot of luck. Kit includes 58-pg. "ABC's Of Gold Panning" book, a 14" regulation size plastic gold pan (works great with magnets) with "gravity trap" ripple wall, 25 lb. pull ceramic magnet with handle (for separating magnetic black dirt), and a 9X 3-lens magnifier for gold flake identification. Since gold prices have increased at such a fantastic rate, even poor gold panning areas all over the country are now prime locations and increased panning returns are very possible. Don't miss out on your rightful share of buried gold. There's gold in them "thar" hills and you can find it. **No. 71,932 $10.00 Ppd.**

Professional Sub-Soil Moisture Tester

Effectively measure water content from 2-26" beneath the soil, with 2 interchangeable probes in 13" and 26" lengths. Multiply crop yield, increase value of arable land. No digging, no guessing; locate underground leaking water pipes or septic system drainage problems. Amazingly accurate, lightweight, easy to use. Insert to desired depth, press button, and it quickly records the reading as you record the results. Height—17½" overall with 13" probe; accuracy ± 1 division of full scale. Uses 6 AA batteries (not incl.).

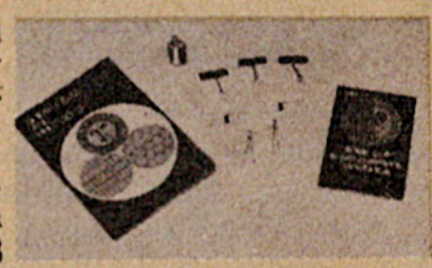
No. 80,211 $89.95 Ppd.

Super Loud Horn!

The loudest horn we've tested. 4" portable trumpet freon horn really lets out a blast which can be heard over 1 mile over water. Conforms to U.S. Coast Guard whistle requirements for pleasure boats to 65 ft.!! It gives a full-throated volume by squeezing the trigger (locks for prolonged blasts). Durable trumpet with all-weather chrome finish, gives 300 2-second blasts with 15 oz. of Freon 12. Great for football games, track events, hiking, boating, any occasion where you want to be noticed. Caution: Due to the extremely loud db. rating on this item, we do not recommend its use by children. Always point horn away from ears, and don't use indoors. 4" trumpet; 15 oz. can. **No. 71,915 $14.50 Ppd.**

Replacement Freon Cans (15 oz.) No. 42,088 $2.49 Ppd.
12 cans or more @ $2.25 ea. Ppd.

Harness The Sun's Energy . . . Deluxe Solar Cell Kit



Back by popular demand, a deluxe solar cell kit. Discover possible ways to help our energy crisis with "free" electricity from the sun. Great for Science Fairs & experiments. You get: 3 selenium, 2 silicon & 2 cadmium sulfide cells; solar cell motor which operates on .35-1.5v with direct couple to solar cells; and 2 books, "Solar Cell Experimenters Handbook" (25pp), & "Solar Cells & Photo Cells" (100pp). Loaded with many projects for practical applications of solar energy. **No. 61,024 $14.95 Ppd.**

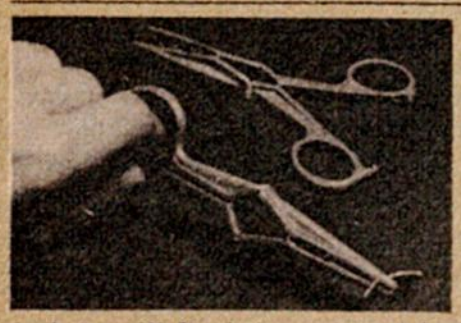
THE ITEMS ON THIS PAGE ARE NOT IN INDEX.

Be A Super Snooper . . . With Spy Scope

Look around corners . . . over fences and walls . . . watch parades and golf tournaments even when you're packed behind other people. It's great fun for kids playing army or super spy or learning about reflection. Heavy duty cardboard construction with two glass mirrors. Overall size: 3 x 4 3/8 x 18". **No. 71,914 $1.50 Ppd.**

3 or more @ $1.25 Ppd. each

Plastic Locking Forceps

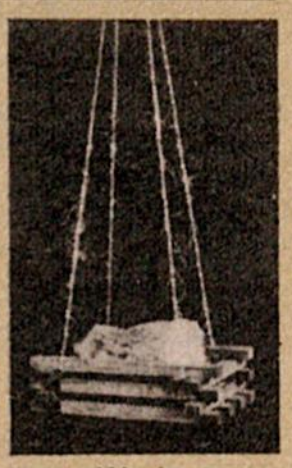


Efficient & Inexpensive

These durable 4¾" hemostat-forceps are excellent for working with hot or corrosive materials, handling gels, slides, tubing, even living tissue. Hobbyists will find them ideal for clamping or gripping small model parts, securing electrical components, even removing hooks while fishing. Can be sterilized for continued use or disposable. Convenient scissor-like handles have a locking ratchet to lock tips tight; double jaws with teeth that grip even paper thin objects; "living hinges" provide extra leverage. Pkg. of 12 forceps with instr. **No. P-42,086 $6.50 Ppd.**

Amazing Planter Sponge

Eliminates Messy Soil And Nutrients.



This deep sea sponge contains enough natural living materials to provide adequate food supply for growing plants and flowers from seeds. Just poke the incl. seeds gently into the sponge, water, and watch them sprout! Planting sponges have been popular with the Greeks for decades and are now available to you in this magnificent hanging wooden planter. Works great with your own plant cuttings, too. A beautiful addition to your indoor gardening hobby. Instr. incl.

No. 71,912 $6.95 Ppd.

6½" F.L. Mounted Anastigmat Lens

• Brand new! • f/6.3 • Coated Lenses

Made for a discontinued projector. Excellent for building a 2¼ x 3¼" transparency or opaque or long throw 35mm projector. Cooke triplet type lens system for flat field & excellent definition. Satin finish aluminum mounting with spiral grooves on barrel for focusing. Barrel size: 1 13/16" O.D.; 2 7/16" long.

No. 60,206 $15.00 Ppd.

5 Years On One Set of Batteries

5 Years of savings using this 5 3/8 x 3 x 1¾" charger and 2 "D" Ni-Cd Batteries. Charge them over and over . . . either 1 or 2 at one time. Complete charging takes 16 hours.

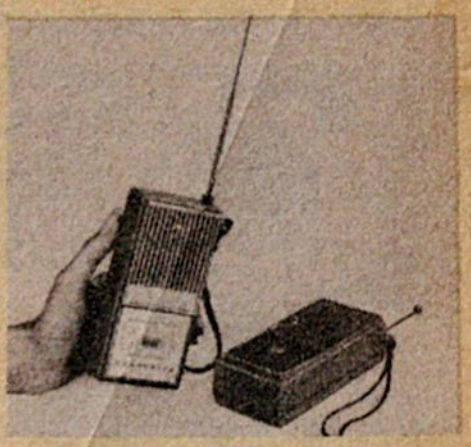
Charger & 2 Ni-Cd "D" Cells

No. 60,591 $9.95 Ppd.

"Coinshooting—How and Where To Do It"

Written by a professional coinshooter for the hobbyist who wants to make his new metal detector pay for itself quickly. Over 80 major areas of coinshooting are covered from definitions to public laws. Learn the most unusual places to find coins, the "secrets" of turning a fun hobby into a real money-making habit, etc. 58pp; 5½ x 8½"; pprbk. **No. 9128 $2.50 Ppd.**

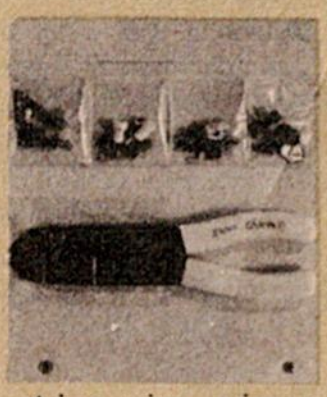
Morse Code Walkie Talkies



More than a toy, these great Walkie-Talkies can be used 3 ways: (1) to talk and listen—reliable 2-way communication; (2) to send and receive Morse Code messages; and (3) to practice Morse Code with the code signal key. Good up to ½ mile over land and water (depending upon conditions, terrain, etc.) . . . in areas where buildings and other obstructions exist, the range may be 1-2 blocks or less. 2 walkie-talkies (5½ x 2½ x 1½" each) with batteries and crystals, solid state circuitry, adjustable volume, telescopic antenna, high impact plastic cabinets, 2¼" dynamic speakers, and instr. incl. Great fun for all ages! **No. 61,019 $19.95 Ppd.**

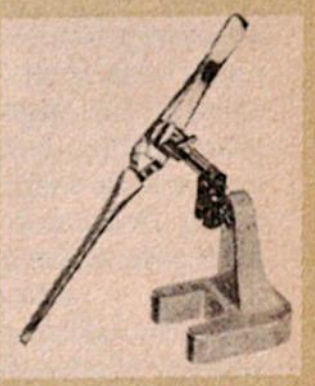
Electrical Super Tool

With Solderless Terminals



Everything needed to steer clear of electrical problems. This fool-proof professional electrician's tool is ideal for handyman, hobbyist, or engineer. So versatile and easy to use. You get 26 of the most common color-coded solderless terminals and a super tool that cuts and strips wire, crimps terminals to perfection, and shears bolts and screws without damaging threads. Comfortable vinyl handgrips and tempered carbon steel construction insures long tool life. Stud size and wire stripping gauge legends are stamped on the tool for added convenience. Comes in compact 3 x 8½" foldaway vinyl case with instr. **No. 61,021 $8.95 Ppd.**

A Third Hand For Those Who Don't Need a Two-Handed Jig



An inexpensive versatile third hand that frees both hands for work. Features self-locking (cross lock) tweezer which can be positioned to length and angle desired by adjusting wing-screw. Mounted in a double ball joint to a heavy iron base for stability. Ideal for soldering, gluing, positioning, fastening, repairing, assembling, etc. Tweezer exerts 1½ lb. tension on blunt ends. An indispensible tool for the factory or home workshop. Base 2 x 2 x 2½"; 5½" tall; tweezers 6½" long.

No. 60,969 $5.75 Ppd.

Gram/Ounce Pocket Scale

Folds to a convenient 1¼ x 3½" sq. Weighs 0 to 16 oz. or 0 to 450 grams. Great for diet control or to estimate postage weight.

No. 41,757 $1.95 Ppd.

It's Ready! The Completely Revised 16th Edition

Norton's Star Atlas . . . Norton & Inglis

Completely rewritten and brought up to date . . . the lists of telescopic objects revised and enlarged! Classic, valuable reference on 9,000 stars, clusters, nebulae; lists of over 700 interesting objects; maps of the Moon and Mars with numbered indexes and features. Chapters deal with definitions, photography, telescopes, useful addresses, etc. The most complete text of astronomical information available for the amateur observer and general reader. 116pp; 40pp of Star Charts; 8½ x 11"; hrdbk. **No. 9464 $12.50 Ppd.**

Fully Aware Of Our Nation's Pollution Problems? Environmental Protection Agency Slides—

Tell It Like It Is!

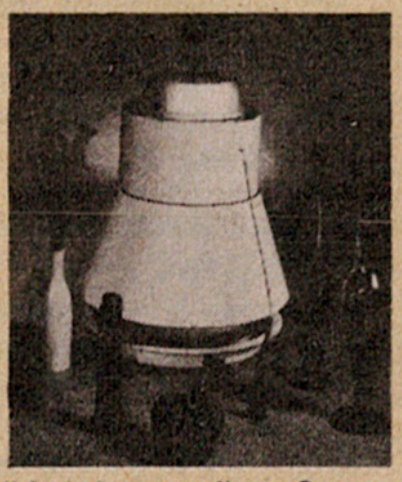
Although everyone speaks about our environmental crisis, very few realize the specific problems and their extent. We've selected 20 of the most alarming full color 35mm slides, taken by the nation's greatest environmental photographers, to show the damage being done to our planet. These EPA Documemerica slides are combined with a detailed reference guide, enhancing the presentation and giving each picture ecological significance. Subjects include strip mining, noise pollution, insecticides, solid wastes, air pollution, etc. Teachers from elementary school through college will find this a great tool for their environmental study programs. Great for clubs and civic organizations.

No. P-42,085 $5.95 Ppd.

Space Slide Sets & Visual Aids, see pages 22-23.

Completely New Hobby Furnace or Kiln

For . . . • Glass • Ceramics • Enameling • Fun

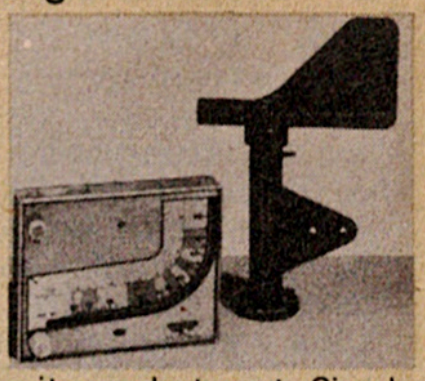


Provides maximum versatility in all glass and ceramic hobby applications. This amazing light-weight furnace (less than 12 pounds) stretches, sags, & melts glass bottles and fragments to produce beautiful and exciting decorator art. It also fires greenware and ceramic shapes . . . and performs traditional enameling. Space-age insulating and heating materials produce an extremely responsive, easy-to-use furnace. Has 2 sections so it accommodates both tall and short items (internal dia.: 8″; internal height: 12″). Each section has its own grounded power cord to control heat individually or simultaneously. Maximum operating temperature of 2150°F. (1180°C.) can be achieved in 1 hr. 15 min. using 115v input. Includes asbestos insulated glove, steel tongs, 50 ft. high temp. wire for bottle hanging, ½ lb. glass separator, and instr. **No. 80,213 $179.95 Ppd.**

Glo Mor Darkroom Photo Tape . . . Waterproof

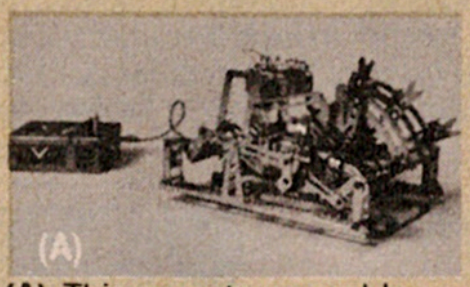
Especially designed by photographers for darkroom applications. Now used by one of the leading photographic businesses in our country, this self-adhesive, phosphorescent tape can safely identify spots on wall, areas of danger, switches, timers, etc. Coated with a thin plastic coating, it remains waterproof when wet. Brightness is critically controlled so that photosensitive material won't fog. Other uses are: fishing lures, safety reminder of obstructions, and electrical switch plate identification. Pkg. of two ¾ x 24″ rolls. **No. P-42,083 $2.95 Ppd.**

A Rooftop, Remote-Reading Wind Speed Indicator . . . Only $29.95

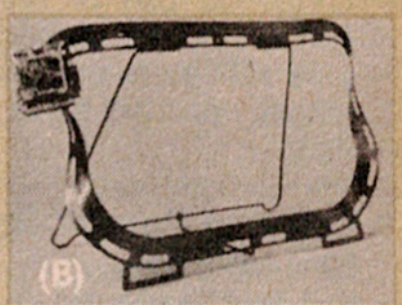


That's right! We're proud to present a completely pneumatic wind speed indicator at an amazingly low price. Accurate enough for use by weathermen, it out performs many units priced well above its modest cost. Simple and reliable; 100% "wind powered"; nothing to get out of order or adjustment. Wind pressure aligns the rooftop sensor, pressure enters and is transmitted through plastic connecting tubing to red fluid inside; and a reading is registered in both mph and Beaufort Scale on the handsome indicator. Easy-to-assemble set contains indicator, 50 ft. of flexible tubing, rooftop sensor/vane, mounting hardware, fluid, and instr. Made of metal and sturdy plastic; 7½ x 6 x 1¼″. **No. 71,931 $29.95 Ppd.**

Construct And Control Step Dozer A Robot-Like Mechanical Monster



(A)



(B)

(A) This easy-to-assemble action kit is the product of recent mechanical engineering. Made of sturdy steel plate, Step Dozer is held together with nuts and bolts ready to obey your commands. Just place 2 "D" batteries (not incl.) in the control box and start the action. Operation of three levers enables your robot to advance, retreat, mark time, turn right or left, walk obliquely, and step sideways. Completely safe, levers can be handled even while the machine is operating. Great for hobbyists, school projects, experiments, etc. Why not try to assemble one with your own technique? Complete with detailed instr., tools, and programming chart. Size: 4 x 8 x 2″

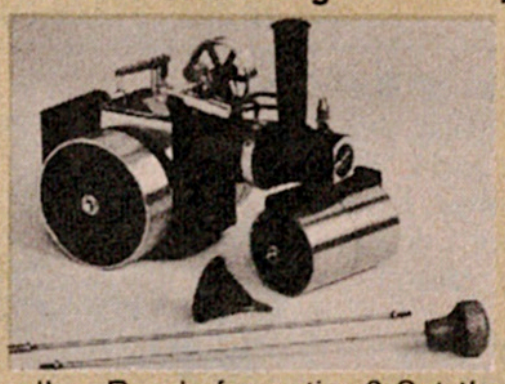
No. 71,922 $16.95 Ppd.

(B) Mechanical Acrobat Monorail—same type of construction kit that lets you build a standing monorail system. Car travels and hugs rail with 3 wheels even when running a sharp curve or upside down. Runs on 2 "AA" batteries (not incl.) Size 15 x 2 x 10″.

No.71,921 $13.95 Ppd.

Authentic Working Steam Roller

• A True Steam Engine • Heavy-Gauge Metal



This beautifully-made working steam roller is hand crafted in England. Steam power allows you to run it forward, backward, regulate speed, pull other models . . . even run the engine independently by locking the roller. Ready for action? Set the steering or use the 12″ extension steering rod and drive it yourself. Exhaust exits through the traditional black chimney, or can be used to power the mighty whistle. To operate, simply fill the safe vaporizing spirit lamp with wood alcohol (not incl.), slip it under the boiler in the firebox, and crank the flywheel. Other features include overflow plug, safety valve, brass cylinder and piston, and funnel. Sturdy 10¼ x 6 x 7″; weight 4 lb. **No. 71,934 $35.00 Ppd.**

THE ITEMS ON THIS PAGE ARE NOT IN INDEX.

Announcing . . .

An Electronic Slide Rule Calculator

That's Portable & Under $100.00!

• Easy to use • Weighs only 9 oz.

This simple-to-operate Texas Instrument Calculator does the work of classical slide rules but with split second accuracy. A bright red display shows 8-digit numbers, 2-digit exponents, minus signs, overflows, even low battery warning. Ideal for the serious student or calculations on-the-go due to its 9-oz. weight and long-life Ni-Cad rechargeable batteries (incl.). Also has an AC power converter/charger for home and office use. So versatile . . . handles numbers as large as 9.9999999×10^{99} or as small as $1.0000000 \times 10^{-98}$. In addition to the standard four functions, this instrument does square roots, squares, reciprocals, automatic conversion to scientific notation, and mixed calculations. An engineer's delight: 6¼ x 3 x 1¼". Case incl. **No. 78,011 $99.95 Ppd.**

Deluxe Engineering Desk Model

- **6¼ x 8¼ x 2⅜"**
- **Less than 2 lbs.**

A larger version of above (No. 78,011) that also computes factorials, π (pi), or ∈ (epsilon) to 13 significant digits.
No. 78,014 $179.95 Ppd.

Deluxe Dietzgen Slide Rule Calculator, see page 12.

A Dynamic Duo From Texas Instrument!

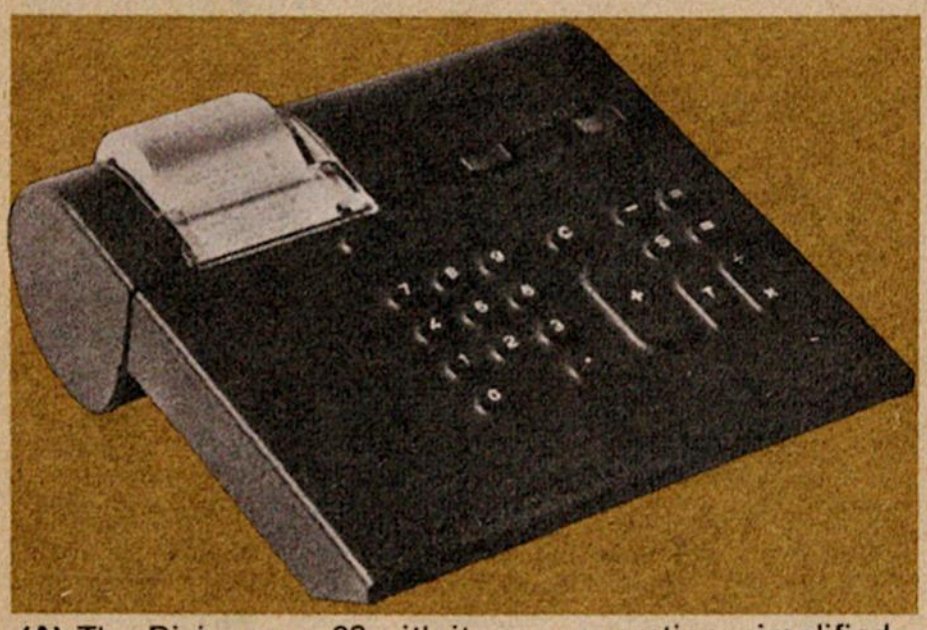
Electronic Calculator/Digital Clock Combo

This beautifully designed calculator features instant calculations plus credit balance, a constant function, floating or preset decimals, chain or mixed calculations, and a fantastic digital clock. Large 10-digit display shows all numbers clearly for hours of fatigue free use. The digital clock appears on the display board giving hours and minutes. Ready to calculate? Just switch to the "C" position and the clock keeps time during your 4-function calculations without resetting. Beautiful wood-grain keyboard makes this an exciting addition to every executive's desk. 6¼ x 8¼ x 2⅜". **No. 78,010 $99.95 Ppd.**

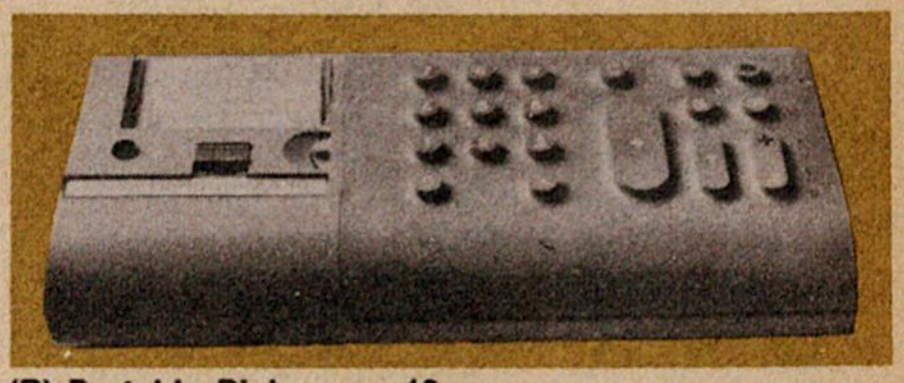
OLIVETTI DIVISUMMA— Electronic PRINTING Calculators . . .

That Everyone Can Afford!

- **Print To Help You Remember**
- **Quiet To Help You Think**
- **New Thermo-Print Process**
- **Unique Dust-Free Design**



(A) The Divisumma 28 with its easy operation, simplified keyboard and printed tape is truly a versatile calculator. It features non-impact printing eliminating the need for a messy ribbon. Its rubber keyboard is logically designed to simplify entries and prevent dust from reaching the internal components. Quickly calculates four functions and credit balances with constant multiplication and division. Remembers the last figure entered and all totals. 12 digit capacity with decimal settings of 0, 2, 3, and 4. Compact design (8 x 9 x 3½") fits neatly on any desk. **No. 78,012 $259.00 Ppd.**



(B) Portable Divisumma 18 . . . Goes With You Everywhere!
Performs all the functions of the 28 . . . but is portable and rechargeable. The sleek design and AC recharger/cord make it ideal for desk, briefcase, or anywhere rapid and accurate calculations are needed. So light and compact (2-lb.; 9¾ x 4½ x 2") it's beautiful! **No. 78,013 $279.00 Ppd.**

Refill Rolls of Olivetti Paper. Fit both No. 78,012 and 78,013. Pkg. of 4. **No. P-61,026 $4.25 Ppd.**

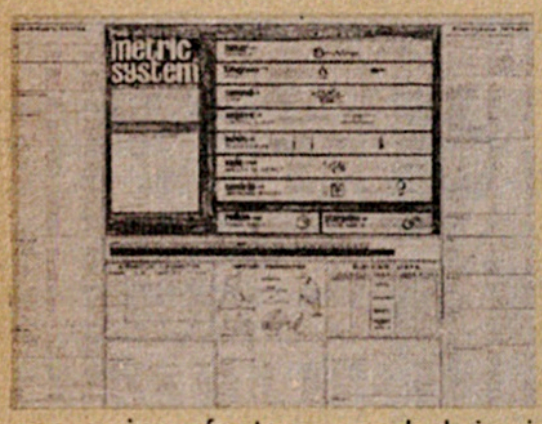
Science Fact or Farce?? A Clock Within Your Body?? Bio-Rhythm Charting & Analysis . . . Can it help your life?

Recently we've read many fascinating reports on Bio-rhythm, a series of calculations to prepare and alert you daily of your ever-changing physical, emotional, and mental potentials. We are told that vast mood shifts are caused by your body's **Internal Time Clock** whose rhythms can be charted ahead. Some days you're full of energy, work is easy, and everything goes well. Other days it's just the opposite. We aren't sure how well this really works, but here's your chance to try it along with us. Bio-rhythm charting has already been valuable in industry. The Ohmi Co. in Japan plotted bio-rhythm charts for all 500 of its bus drivers. Those scheduled to have "critical" days were reminded to be on the alert. Accidents dropped off 50% in the first year alone. Each Bio-rhythm kit includes the Cyclgraf Charting Kit, the

precision metal Dialgraf Calculator, and complete instr. By charting the 23-day physical, 28-day emotional, and 33-day intellectual cycles, bio-rhythm analysis is possible. Since your cycles started the day you were born, you can compute your "critical" periods and chart your potentials. Let us know your results so we can compare notes and share them with our customers.

No. 71,949 $11.50 Ppd.

The Ultimate in Metric Conversion



A Super Chart That Covers It All!

Edmund Scientific, a leader in U.S. Metrication, introduces the Modernized Metric System. This beautifully designed, 28 x 22½" two-color wall chart includes relatively all possible conversion factors needed in industry, school, and home. We've assembled data from nearly every unit of measure used in this country today, and have broken the conversion factors down to small exponential form for instant use in computers & other electronic data transmission equipment. There's not enough room here to list all of the units covered, but aside from the usual volume, weight, area, and distance conversions, the chart is unique. Where else could you find at your fingertips conversions for acceleration, mass, flow, density, power, heat, light, time, torque, electricity, magnetism, and energy? They're all there with diagrams, drawings and descriptions. Even includes a section on common automotive conversions and clothing sizes. This chart undoubtedly belongs in every industrial facility, research lab, classroom, as well as in your home. It may be all you need to learn the new system. Who said metrication had to be difficult and costly? **No. 71,954 $3.00 Ppd.**

10 or more Only $2.75 Ppd. Each

New Edmund Lasers $99.50 & Up

• TEMoo • Cold Cathodes • Low Priced

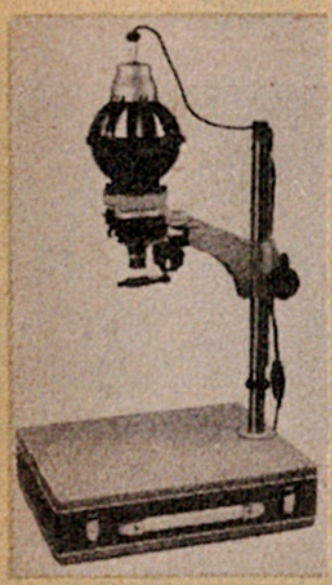
New additions to our line that are perfect laboratory lasers at prices you can afford . . . whether for teaching, research, industry or experimenting. (Other lasers pg. 151)

0.3mW Laser . . . only $99.50. 1.2mm beam dia., 2.0 mRad beam divergence, 110v. A fine general purpose laboratory laser. **No. 79,061 $99.50 Ppd.**

1.0mW Maximum Laser for school use. Meets proposed regulations on lasers for school use. 1.0mW max., 1.2 mm beam dia., 1.0mRad beam divergence, 110v. **No. 79,064 $150.00 Ppd.**

Talk On A Laser Beam. 15% modulated laser, 1.0mW max. Meets proposed regulations on lasers for school use. 1.2mm beam dia., 0.8mRad beam divergence, 110v. **No. 79,026 $200.00 Ppd.**

3.0mW Laser. A high powered professional lab laser that stands up to your most demanding requirements. 1.0mm beam dia., 0.8mRad beam divergence, 110v. **No. 79,052 $325.00 Ppd.**



Portable Autofocus Enlarger (In An Attaché Case!)

Our tests on the lens in this enlarger showed very good results, but its greatest value comes in its complete portability. This precision-built high performance enlarger sets up in seconds and stores quickly away in a compact attaché case (4 x 11 x 15"). Ideal for the photographer on-the-go, apartments, or simply where space is a limitation. Includes time saving, accurate, automatic focusing; precise 35mm single glass negative carrier; half frame and 16mm masks; crisp 4-element, f/3.5 50mm anastigmat lens; two optically corrected condensers; filter drawer; and adjustable lamphouse. A sturdy, completely portable, compact, autofocusing enlarger with optical condensers and filters. It uses a G.E. PH211 lamp (not incl.) or equivalent. Imported. **No. 71,919 $99.95 Ppd.**

See Nature At It's Finest

With Famous Walt Disney Slides

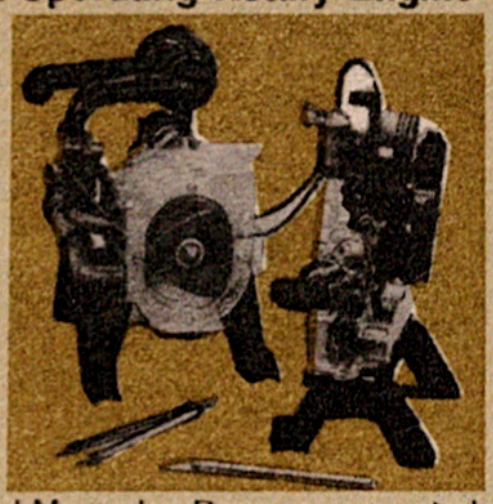
Only $3.75

Walt Disney's world renowned staff of nature photographers have roamed the four corners of the globe to bring you the finest pictures of animals in their surroundings available anywhere. These 35mm full color super slides are actually excerpts from fabulous Disney nature motion pictures: Bear Country, White Wilderness, The Living Desert, The Vanishing Prairie, and Beaver Valley. Kids love them! Great for environmental education presentations in schools, clubs, scouts, etc. A real collector's item. Each set contains 20 beautiful slides. Get all 5 sets. **$3.75 Ppd. per set.**

Bear Country **No. P-61,028;** Desert **No. P-61,030;** White Wilderness **No. P-61,029;** Prairie **No. P-61,031;** Beaver Valley & Grand Canyon **No. P-61,032.**

The Visible Wankel Kit . . .

⅓ Scale Transparent Operating Rotary Engine



An easy to assemble kit that's perfect for showing a class how the Wankel operates. The multi-colored chamber background makes it easier to understand the underlying principle of rotary engine systems. A valuable lesson in the battle against pollution because in the near future cars built by General Motors, Porsche-Audi, and Mercedes-Benz are expected to be powered by rotary engines. When you complete your model, it is hinged to divide directly in front of the rotating piston to reveal the combustion chambers. The entire cycle is perfectly timed just like a real Wankel . . . the spark plugs fire within chamber at the precise point of crankshaft and rotary piston movement! More than 125 plastic parts plus motor and all necessary components. Detailed instruction manual and 12-page history of the Wankel Engine also included. Requires 2 "C" batteries (not incl.). **No. 80,212 $16.95 Ppd.**

1/5 Scale Wankel Kit (p. 27) **No. 71,424 $6.95 Ppd.**

Actual Wankel Demonstrator. Ideal for use in classes or as a functional model airplane engine. Has almost 40% fewer parts than most motors. See page 27 for complete details. **No. 71,860 $99.50 Ppd.**

Gravestone Rubbing Kit

An unusual hobby with a historical background!

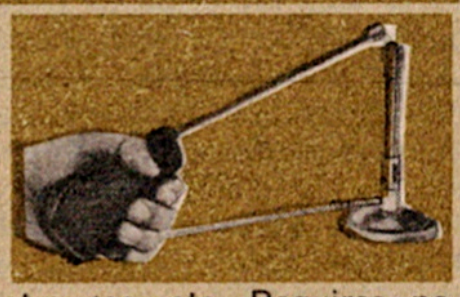
Rubbing is one of the earliest forms of graphic reproduction (first used over 2000 years ago) . . . and now you can try your hand at it. Preserving the carving of ornamental gravestones by rubbing can make a fascinating hobby in itself, but this kit can also be used to make reproductions of brass reliefs, manhole covers, woodcarvings, leaves, engravings, medallions, etc. All you do is tape the rubbing paper over the object (the presence of relief is essential) to be printed, rub a wax stick over the surface of the paper, polish with a nylon stocking, and your reproduction is ready to be framed for display or added to your scrapbook. Kit includes: 4 large sheets of rubbing paper; 2 black wax rubbing sticks; masking tape; stone cleaning stick; instructions; and the 40-page paperback "Reproducing Relief Surfaces" by William McGeer. **No. 71,908 $6.95 Ppd.**

4 Colored Wax Sticks **No. 42,084 $2.50 Ppd.**

5 Sheets of Rubbing Paper **No. P-71,909 $2.00 Ppd.**

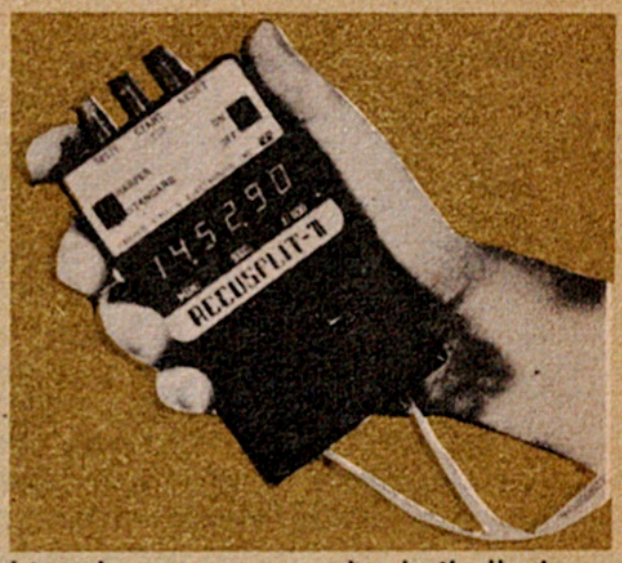
Lab Equipment, see page 56
Astronomy Books, see page 77
Projection Lenses, see page 120

The Matchless Lab Lyter!



Instantly and safely light all standard gas equipment and apparatus in your lab or workshop. Ideal for igniting Bunsen burners, propane torches, oxy-acetylene torches, gas hot-plates, etc. Requires no batteries, flint or fuel. Just a squeeze on the trigger produces a spark, demonstrating the piezo-electric principle which creates an igniting spark. Moisture will not affect its sure-fire performance. Also use as a shock trainer for conditioning behavior in dogs and small animals without harm. 1x3 x 12½". **No. 71,793 $6.25 Ppd.**

Electronic Digital Stopwatch



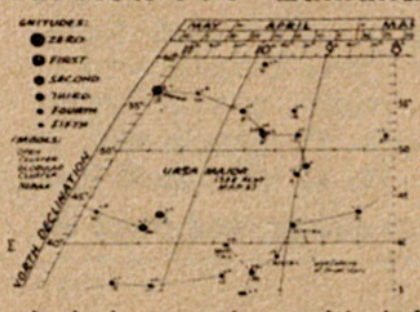
Precise measurement of time for sport, science, or industry is now possible! Accurate to 1/100 of a second, the mechanical stopwatch is now obsolete. Uses are: motor sports, track & field, swimming, racing, basketball, shop, office, or lab. Large, bright digital display provides instant and error-free readouts. It is visible in all lighting conditions, from bright sunlight to total darkness. The accuracy of Accusplit is unchangeable, and the quartz crystal produces lifetime reliability. With no moving parts, it is virtually trouble-free and has a two-year guarantee. Accusplit not only times to 1/100 of a second, but will time two or more participants in the same event. It clocks an unlimited number of intervals while still clocking the overall event. Perfect calibration each time it is used, with never a need for adjustment, and temperature drift accuracy is far superior to conventional stopwatches. Comes completely solid-state with a set of 4 "C" size alkaline batteries which power it for 100 hours of practical use. Six running digits offer continuous display . . . running time is always visible. It times to 99 minutes, 59.99 seconds, and then starts over at zero, allowing timing of events for several hours. Accusplit combines all functions provided by over 90 different mechanical stopwatches. Large (5/16") neon orange digits provide a readable display under the most adverse conditions. Specs.: Accuracy ±. 0001%; Temperature drift accuracy ±. 005% @ −40 to 70° C.; 6 digits; Range—99 min., 59.99 sec.; Timing units—1/100 sec.; Power supply—4 "C" cells (incl.); Battery life—continuous use with all digits on: 6 hr., practical in-use average: 100 hr. Wt.: 6 oz. (without batteries).

No. 1645 $99.95 Ppd.

Jet black case ($12.50 value) included free.

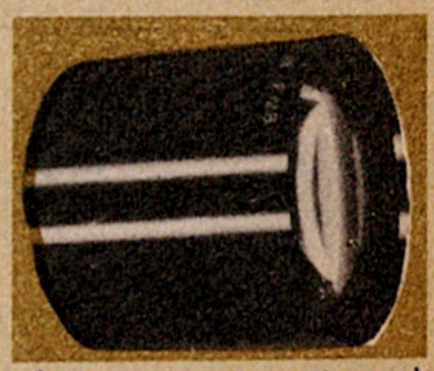
Mechanical Stopwatches, see page 97.

Explore the Heavens with the All New . . . "Edmund Mag 5 Star Atlas"



This atlas shows all stars to magnitude 5.0 to 60 deg. south declination. The scale is a convenient 1/8" per degree which allows you to measure eyepiece field with an ordinary ruler. Lists of selected sky objects are included, together with informative pages on basic astronomy, finding methods, etc. Complete with constellation index and moon map. All new, sinusoidal projection with maps and star lists updated to 1970. Illus.; 8½ x 11"; 36pp; pprbk. **No. 9118 $1.00 Ppd.**

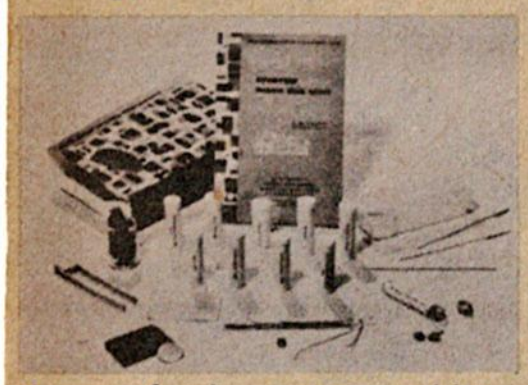
Surplus Copy Lens



- **6½" F.L.** • **f/2.8**
- **4 x 5" coverage**

6½" F. L. Lens of excellent quality . . . tested at Edmund's! Good definition; flat field; fast lens (f2.8); 4 x 5" coverage; color-corrected coated anastigmat. Exceptional for making post card coverage on opaque projectors, overhead projectors, etc. **No. 42,100 $29.95 Ppd.**

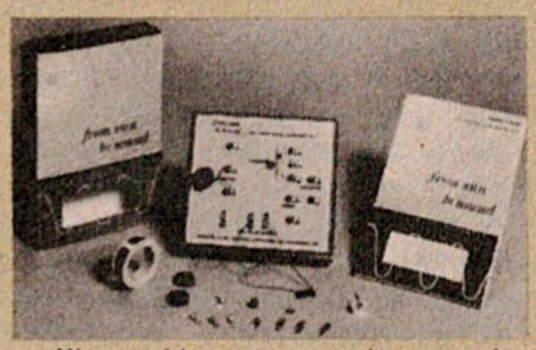
Energy From The Sun



Created by the co-inventor of the famous Bell System solar battery, this kit contains all the materials needed to turn silicon slabs into working solar cells. The accompanying text explains the principles and theory of solar energy and its application to solid state physics. You also build a high temperature solar furnace and additional experiments using your solar cells. You get chemicals, wire, solder, forceps, plating bottle, tape, steel cups, silicon wafer, edison base coil, and 94-pg. book. A great science project or classroom study unit.

No. 71,906 $19.95 Ppd.

From Sun To Sound

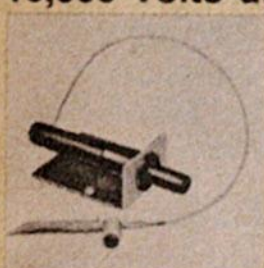


Another great kit from Bell Labs, Sun To Sound provides all the components necessary to build a solar powered, transistorized, audio oscillator. You can monitor results through the included earphones and read up on transistors, solar cells, transformers, and capacitors in the 118-page textbook (included). Geared particularly for student involvement, Sun To Sound teaches the student to design his own circuit parameters. An innovating and exciting project!

No. 71,905 $9.95 Ppd.

More Science Kits, see page 91.

18,000 Volts at the Push of a Button!

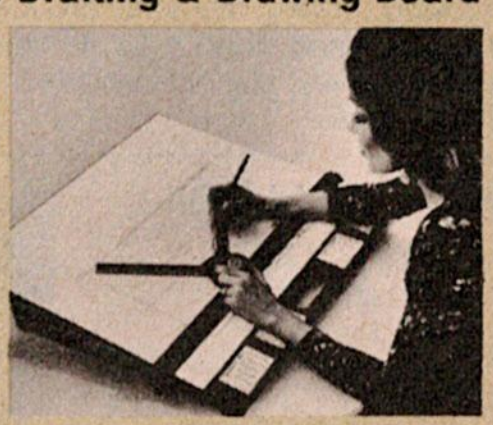


This piezoelectrically energized, solid-state gas lighter creates a powerful spark for instant lighting of any flammable gas. So simple . . . merely push the button & the energized ceramic capsule releases its 18,000-volt spark through the universal electrode. Great demonstrating piezoelectric theories, product design, welding soldering torches, portable propane stoves and lanterns, or anything requiring a high-voltage spark. Metal bracket and 9" teflon wire make it convenient to mount permanently. Operates 1 million cycles. Typical spark gap: 3/16-¼". Overall length: 3" capsule with 2" electrode.

No. 42,102 $5.95 Ppd.

Piezoelectric Demonstrator, see page 90.

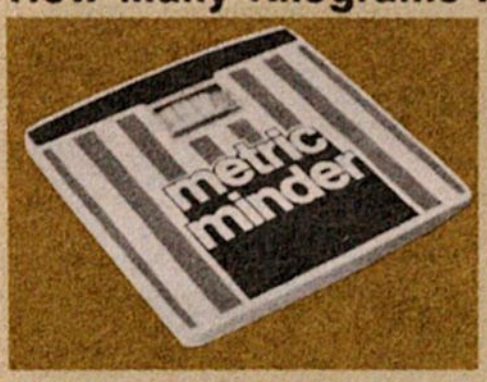
Have Board, Will Travel
Completely Portable Drafting & Drawing Board



This unique all-in-one drawing board, drafting machine, and parallel straight edge is perfect for engineers, artists, draftsmen, and students. Lightweight, yet ruggedly constructed, the board is made of virtually unbreakable plastic with a smooth, hard, non-marring surface. A sliding black anodized-aluminum horizontal ruler and adjustable quadrant with engraved scales (in. and mm) make this a must for people on the go. Also features removable drafting machine, inch-to-millimeter conversion tables, storage compartments, detachable, self-storing legs, clamps, and a carrying handle. 24½ x 19½"; 14 lb.

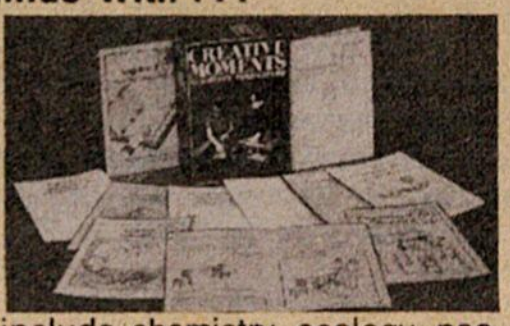
No. 71,925 $49.50 Ppd.

How Many Kilograms Are You?



The U.S. will go metric. Although it's taken us over a hundred years to decide, a national conversion is on the way. There are presently 12 bills pending Congressional approval that will enable a gradual conversion from our present English system to the system used by every major country in the world today . . . the Metric system. Will you be ready? This "Metric Minder" scale is a must for teaching and learning weight conversions. Kids will love jumping on this snappy red, white, and blue rectangular scale. Weight registers on the unique double dial giving both pounds and kilograms, simultaneously. Carry it anywhere—weighs just 3 pounds. You might even decide to put it in your bathroom while not using it in the classroom. **Not legal for trade.** **No. 71,907 $9.95 Ppd.**

Challenge Young Minds With . . .
Creative Moments



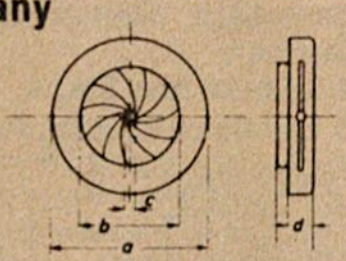
50 scientific investigations to motivate youngsters (ages 10-14). With each activity, the young scientist learns something new about his world or himself. Subject areas include chemistry, ecology, people, and investigative techniques. Each color-coded, reusable, folder has easy-to-follow directions and illustrations and uses everyday materials. Designed by educators for children to do individually or in small groups. Great for home activities or as self-contained teaching units to supplement science programs. Learning is doing! Kit: 7½ x 5 x 2¾". **No. 71,933 $4.00 Ppd.**

Circular Ceramic Magnet

- **Great for Demonstrations**
- **35-lb. Pull**

Only 2" in dia. but what power! This round ceramic magnet in a steel case, is perfect for schools and hobbyists. A brass screw eye in the center lets you hang it, attach it to pulleys, or use as a handle. Science Fair experimenters will find dozens of ways to utilize this little "strongman". **No. 42,098 $3.00 Ppd.**

Iris Diaphragms From Germany



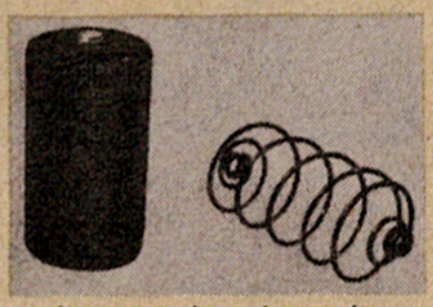
We've just located a new source of precision iris diaphragms that will help us combat the past long lead time problem. By offering quality iris diaphragms from 3 different sources (also see pages 15 & 135) we hope to provide quicker delivery. Please specify alternate diaphragms so we can substitute them in case stock is depleted on your primary choice. Naturally, our invoice will reflect any increase or decrease in price caused by the substitute. All are top quality and fully guaranteed. Use them on cameras, enlargers, illuminators, instruments, O.E.M., anywhere variable precision aperture is needed. Available March 1974.

Outside Dia. (a)	Aperture (mm) Max. (b)	Aperture (mm) Min. (c)	Thick (d) (mm)	Stock No.	Price Ppd.
82mm (3.28")	60	4	10	42,119	$33.00
60mm (2.4")	40	2.5	7.5	42,120	17.50
48.5mm (1.92")	30	1.2	7.5	42,121	16.70
40mm (1.6")	27	1.2	6.5	42,122	19.90
22mm (.88")	14	1.0	5.5	42,123	16.00
15.5mm (.6")	8.5	1.0	7.0	42,124	14.50

THE ITEMS ON THIS PAGE ARE NOT IN INDEX.

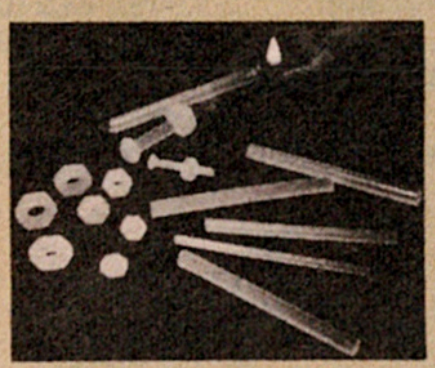
Tomorrow's Energy is Here Today!

Lithium Batteries . . . 9 Times More Power



Containing the lightest solid-state element known, the lithium dry cell brings a new age to portable power sources. Compared to regular flashlight D cells, they are 9 times more powerful (16.4 w/hrs), are 5 times lighter per power unit, deliver almost twice the voltage (2.8v for 90% of life), and have 400% more energy density . . . even at extreme temperatures (-65° to 160°F). Ideal for emergency equipment where long shelf life (up to 10 years with only 15% loss) insures that equipment will work when needed . . . in the Arctic as well as in the Tropics. Great for O.E.M. and all D cell operated devices, lab use . . . . anywhere long lasting reliable power is needed. 1 Lithium cell replaces 2 regular "D cells" with included spacer. Wt. 2 oz.

1 Lithium "D" cell **No. 42,112 $9.90 Ppd.**



Plastic With A "Memory"

For Instant Fasteners

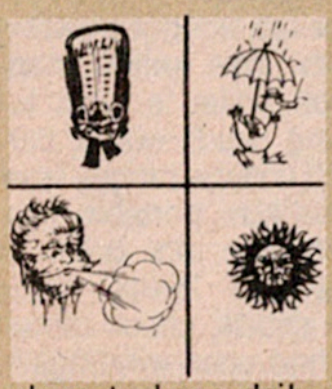
New radio-chemical cross-linking process imparts "elastic memory" triggered by heat. Lets you make plastic nuts, bolts, rivets, screws and other fasteners in seconds. Join metal, wood and plastics. Great for design models; circuit boards; and home, auto, and boat do-it-yourselfers. Heat doubles its diameter and shrinks its length. Heat one end, stick other end through hole in material to be joined, and heat other end. It's easy and quick, non-toxic, non-corrosive. Pkg. of 36 pieces and instr. **No. 42,111 $3.95 Ppd.**

Ultraviolet Safety Glasses

Reduce Eye Fatigue—Sharpen Viewing

A **must** for everyone involved in fluorescence. Protect eyes from dangerous shortwave sunburning. Absorbs all ultraviolet and most visible violet light. We tested them to reduce UV light by over 99%. No haze or fog to peer through. Eliminates "halo" effect in long-wave UV. Wear all day with or without regular glasses.

No. 61,027 $5.95 Ppd.



Was It This Cold Last Winter? Check the Daily Weather Log

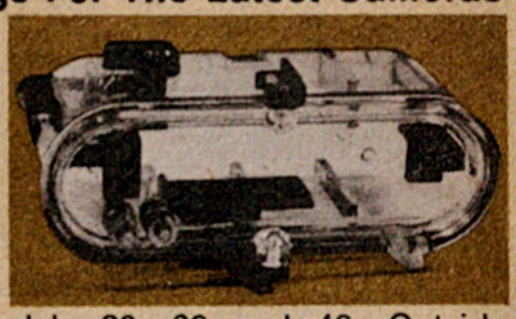
- **Predict & Record Daily Weather**
- **Learn to Interpret Weather Data**

You've seen diaries, ledgers, and pocket memos before. How about a Daily Weather Log? Millions of people watch the official & local weather news every day with no place to keep daily weather records. This log lets you keep the daily weather patterns for one full year. Great for amateur weather forecasters to predict future trends. Farmers, teachers, scouts, hunters, fishermen, and others engaged in outdoor activities will find this book a valuable tool. Each page lets you record detailed information on temperature, humidity, pressure, wind, clouds, etc. There's even a spot for comparing your prediction and the official prediction against the actual weather. Beautifully bound log filled with weather facts, tips and interpretation. 372 pp; 5¾ x 8½"; hrdbk.

No. 9462 $4.95 Ppd.

Underwater Housings For The Latest Cameras

- **Pocket Instamatic**
- **Super 8 Movies**



The best cases we've tested afford foolproof sealing to depths of 300 ft. Heavy-duty clear plastic case fits the all new Kodak Pocket Instamatic® Models 20, 30 and 40. Outside controls for shutter release, film advance, and focus are provided; molded loop for lanyard or neck strap. Also features a mini-flash & battery clip to let you use standard flashcubes under water for better pictures. Lightweight 1 lb.; 7 x 3 x 2½". **No. 71,951 $39.95 Ppd.**

Kodak XL-33® Super 8 Movie Camera Housing: Completely clear molded housing lets you see all camera functions and settings. Eliminates condensation and corrosion problems common to aluminum housings. Ready-to-use with removable handles, shutter release control, and optically perfect ¾" plexi front cover. Allows filming as close as 2 feet underwater. 9 x 6 x 4¾".

No. 71,953 $69.95 Ppd.

Kodak Instamatic® Camera Case for 100, 104, 124 and 134 cameras only. **No. 71,549 $23.25 Ppd.**

Life Saving Fire Ladder

From American LaFrance, a leader in fire protection, an escape device that's a must for every two-story dwelling. No family is immune to the hazard of being trapped in a blazing second-floor bedroom, unable to reach the stairway. Now you can protect yourself and loved ones with a portable, 15 ft. escape ladder made of heavy gauge tubular steel and chain. The best we've seen. Simply place hooks firmly over window sill, let down balance of ladder toward ground, climb down keeping body close to ladder. Takes only seconds and you're out safe and sound. Don't get caught without one . . . you owe it to your loved ones.

No. 71,930 $19.95 Ppd.

Deluxe Collecting Bag

For Rock and Treasure Hunters

Here's a beautiful orange and black nylon Alpine bag for all your collecting needs. Heavy duty duck material with reinforced vinyl bottom makes it perfect for toting sharp rocks and minerals. Large capacity main section with drawstring top; 3 zippered side pockets; 16 x 14 x 6" overall. Comfortable nylon padded shoulder straps let you carry treasure and keep hands free for collecting. **No. 71,952 $11.95 Ppd.**

War Surplus Bargain Rangefinder! ! !

- **Cost Govt. Lots of $$$**
- **Our Price $200**
- **Azimuth-Type Rangefinder from 450-1000 yds**

The optics and mount alone are worth the price. Great for long range surveying, laying out housing sites, golf courses, roads. In excellent condition. Has padded buffers, accurate range reading scale, diopter scale, focusing lever, 80 cm base, carrying case, carrying strap, sturdy tripod, yellow and clear filters. Overall length 36 in. Wt. 29 lb.

No. 85,214 $200.00 T.C.C.

3-Ft. Toy Parachutes

Kids love them! Tie a toy soldier on the 8 shroud lines, toss it into the sky, watch it gracefully descend. Model Rocketeers find it a good deployment chute for recoverable nose cones. 3-ft. dia. all nylon parachute. Govt. surplus aerial flare parachutes originally cost approximately $5.00. Yours now for only $1.50! Carries about 1 lb. Great for outdoor fun!

No. 41,679 $1.50 Ppd.
Package of 4 No. P-41,680 $5.00 Ppd.

Explore Underground Mysteries . . . With the Root Watching Kit

Once this unusual growing box (12 x 12 x 4") is constructed, teachers, students, and plant enthusiasts can study the marvels of underground plant growth. As seeds germinate, roots are clearly visible. Radish, carrots and beets have one type growth. Beans and corn have another. The kit includes all the materials needed to assemble a Root Watching Box: clear unbreakable front viewing panel, wood sides, bottom and back; 4 packets of different seeds; and culture directions. It also includes the 48-page book "A Child's Garden." Helps teachers and children learn together. Has teachers guide, songs, experiments, questions and answers. Topics cover root-view gardening, regeneration, etc.

No. 71,926 $11.50 Ppd.

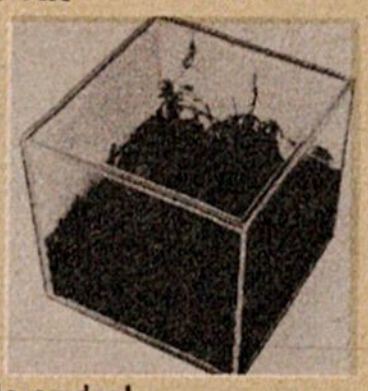
How Many Centimeters Tall Are You?

Visually demonstrate the metric system and measure your child's or student's growth in inches and centimeters at the same time . . . from tot-to-teen. This rigid Masonite Gro-Chart with plasticized tile finish is perfect for making a permanent record of your child's growth. 4-ft. tall (hangs 28" from floor), the chart comes with 15 self adhesive arrows to permanently affix each birthday (measures from 70 to 185cm; 2 ft. 4"-6 ft. 2"). No need to mark inside closets or doors . . . Gro Chart moves with you . . . an ideal decoration for almost any room. It's unique, educational, colorful, & practical . . . a great gift too!

No. 80,214 $4.98 Ppd.

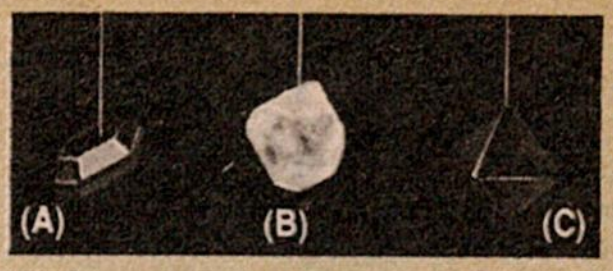
Carnivorous Mini-Terrarium Kit

- **Easy to care for!**
- **Comes complete with plants!**



Only a 4 x 4 x 4" clear terrarium . . . but perfect for housing a minature world of carnivorous (insect-eating) plants. Kit includes cube, 1 Venus Fly Trap bulb, 1 Butterwort plant, 1 Sundew Plant, planting material, and culture directions. Attractive conversation piece for coffee table or desk.

No. 42,097 $5.00 Ppd.



Grow Beautiful Crystals

- **Science Fair Projects**
- **Gem Stones**

It's fun, educational, and easy with these 3 new crystal growing kits. Grow a dozen or more flawless or nearly flawless crystals from each kit. Crystal growing takes place in a super-saturated solution and utilizes neoprene cement and mono-filament line seed attachment. Each contains a 1 qt. crystal growing jar; premeasured chemicals for growing solution and growing seeds; replenisher; stirring stick; grow lid; 6 ft. of monofilament line; neoprene solvent cement; and complete instr. The only other items needed are 4 common household items. Pick the color crystal you want to grow and do it in 3 to 7 days growing time. Study factors affecting growth, symmetry, refraction, etc. Make your own gem stones for necklaces & pendants. Excellent Science Fair projects.

Each Crystal Kit is $4.95 Ppd.

(A) 5% Chrome Alum (light purple crystals) **No. 71,917**
(B) Potassium Alum (clear crystals) **No. 71,916**
(C) 15% Chrome Alum (med. purple crystals) **No. 71,918**
Assorted Crystal Growing Kit, see page 55.

Amazing Waterproof Paper Won't Rip Or Stain

For • Labs • Schools • Scuba Use

Won't rip, stretch, shrink, or wrinkle yet is easily cut, folded, or punched. This fantastic paper is actually polyethylene. It resists all chemicals and is completely waterproof. Simply wash off spills without affecting written material. So versatile you can write underwater with a standard No. 2 pencil. Even use for offset printing, letterpress, mimeo, and spirit duplicators. You get 100 sheets, 8½ x 11". So many uses . . . chemistry classes, engineering labs, outdoor studies, oceanography, photo darkrooms, etc. So unique it's great for demonstrating polymer principles. **No. 61,020 $11.95 Ppd.**

You'll find unusual items throughout the catalog:
Disappearing Paper, see page 24.
Cobra Lillies, see page 44.
Metric Items, see page 124.
Electrical Items, see page 130.

Power Shortage Sufferer? Check it easily!

Test the amperage and voltage of any circuit or electrical device in your home, school, or lab without shutting off the electricity. This swivel snap-around Amp Volt Meter is ideal for everyday servicing needs with 2 current ranges and 3 voltage ranges from 0-600v AC. Pocket-size, portable, rugged, and dependable, it's great to establish balanced loads, trace grounds, locate shorts, check circuit overloads, start and run currents, find open windings in motors, or determine the wire gauge for current capacity. Invaluable for the do-it-yourself electrician, hobbyists, or technician on the go. Wt. 9 oz.; 7 x 2¼ x 15/16"; ammeter range: 0-10/0-50 amps; volts: 0-150, 0-300, 0-600v AC. Includes test leads, case, and instr.

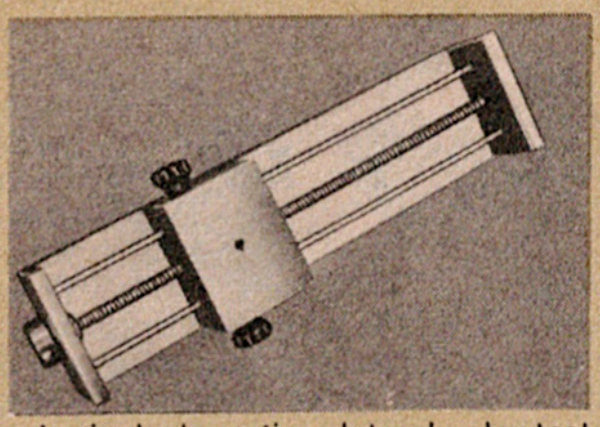
No. 71,913 $49.95 Ppd.

Time-saving accessory. Use with any snap-around ammeter and direct read at outlet without disconnecting equipment. "Splits" double conductor linecord without cutting the conductor. **No. 42,087 $5.95 Ppd.**

THE ITEMS ON THIS PAGE ARE NOT IN INDEX.

Deluxe Rack and Pinion

Used by Labs, Photographers & Serious Amateurs



At Last! Extreme ultra precision in linear movement. Can be used in photography for positioning cameras, parallax correction, special cameras (matt box). Also excellent for optical bench testing; spherical, aberration, lateral color test, longitudinal color correction, coma test. Telescope makers will find it useful in Foucault or Dakin, Rochi, and caustic test. Features unique coarse/fine adjustment. Coarse is 5/8" advance per revolution, fine is 1/16" advance per revolution. Rigid construction of all steel, brass, and aluminum parts. Has long 9" linear movement on a 12 x 3 x 2" platform. Platform (2¼ x 3") has a ¼-20 tapped hole to male thread. Base has (2) ¼-20 tapped holes. Has fine screw advance and oversize locking thumb screw. A fine addition for the professional scientist or accomplished inventor.

No. 71,958 $59.95 Ppd.

Sound Level Integrator . . . O.S.H.A. Safeguard

Automatically Signals When Permissible Daily Noise Exposure Is Reached In Any Area

Noise pollution? Plant Managers **obey the law!** This sound level meter can save you from unintentionally breaking the Federal Law and facing its harsh penalties. For noise problem areas, this instrument automatically computes the cumulative daily noise exposure to determine if the noise level tolerances in a given area are within the requirements of the Walsh-Healey and new Occupational Safety & Health Acts. Has a 4-digit readout, with a large direct decibel reading meter with both an AC and DC output for various types of oscilloscope or voltmeter or recording devices. A 90 db cut-off switch shuts off the counter below this level. The automatic computation is achieved by summing the fractional exposures for the noise provisions within the daily time limitations as stipulated under the Acts. When the permissible limit is reached a red warning light turns on. An amber light glows when the instantaneous sound level in the area surpasses 115 db. It is easy to use, entirely solid state, self-contained, and self-amplifying, as well as being ruggedly constructed to provide extremely long life. 4½ x 5½ x 8½"; uses 115v AC. **No. 1646 $347.00 Ppd.**

Calibrator for Above . . . 114 db at 1000 Hz
Useful to prove validity of tests in court of law and to check meter from time to time. Fits above and other meter microphones (½ and 1" dia.).

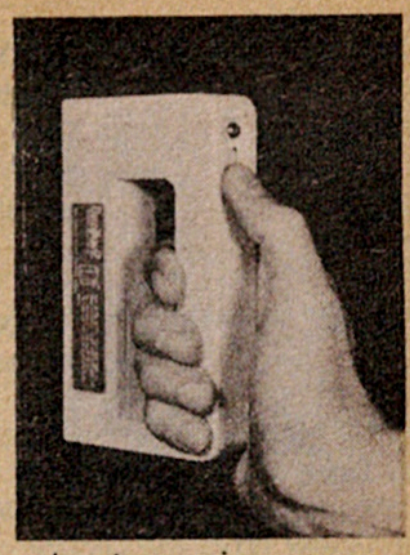
No. 1647 $126.00 Ppd.

Lens Bargain

Schneider-Kreuznach Braun-Xenar f/2.8 Compur Lens. 50mm lens comes on bayonet mount with spring-loaded automatic aperture setting. Automatic depth of field setting and adjustable focus from .9m to infinity. Great for experimentors, hobbyists, and 35mm enthusiasts. A rare buy at this price. **No. 42,117 $20.00 Ppd.**

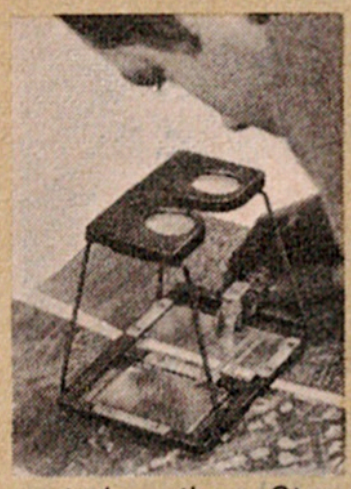
"See" Through Walls!

Hand-Held Highly Sensitive Metal Detector



So responsive it picks up a staple in a letter, yet contains adjustable sensitivity for larger objects such as pipes and cables. You can literally "see" through brickwork, concrete, timber, tiles, plaster and walls. Items such as hidden coins, wires, pipes, reinforcing steel, metal parts of all types can be accurately traced without any danger to user. Ideal for treasure hunters, crime prevention, airport passenger checking, skilled tradesman (stud locator), homeowner, building contractor, letter-bomb surveillance, do-it-yourselfer. Lightweight, single switch operation, detects and localizes ferrous and non-ferrous metal with a high degree of confidence. Range: 0-2½" on a metal object that's the size of a quarter; more on larger objects. Highly visible neon alarm. Uses 9v rectangular battery (not incl.). Instr. incl. **No. 1938 $49.95 Ppd.**

Stereo Viewer



Stereoscope with scales for making precise measurements. Ideal for engineers, geologists, and others using vertical aerial photo maps & 3-D drawings, infra-red aerial photos for ecological studies, etc. Full coverage for prints to 5 x 5". A device for making linear photo measurements. Interpupillary range 55-80mm. Magnification 2X with coated optics. Stereoscope fitted with folding legs adjustable for interocular separation. (Base illustrated not available.) In 4½ x 7¼" permanent case.

No. 42,118 $16.50 Ppd.

Aerial photo reproductions of U. S. and outlying areas available from Map Information Office, U. S. Geological Survey, Washington, D. C. 20242. Write them for info.

Surplus Aerial Cameras: Free! Listing of War Surplus Cameras designed for infinity focus required in aerial photography. Models available incl. K-19B, T-5, S-7A, K-20, F-56. All are well color-corrected, in limited supply, sold on first-come, first-served basis. Ask for **Bulletin No. 9882.**

Insulate With Ceramic Paper Kit

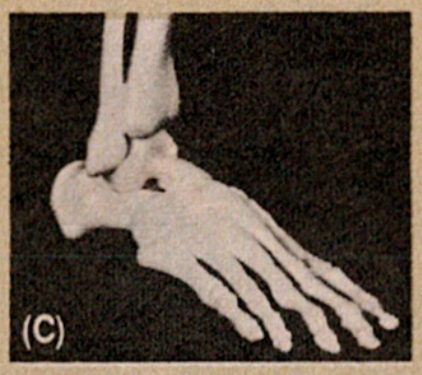
- **Lab**
- **Do-it-yourselfers**
- **O.E.M.**
- **Designers**

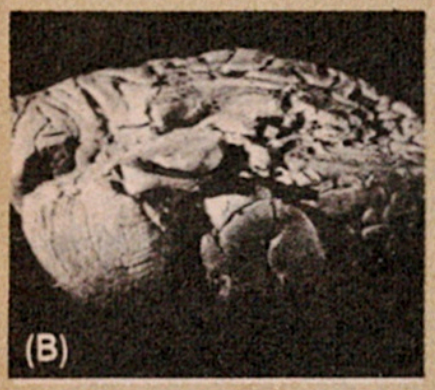
A lightweight ceramic paper that offers excellent conductivity, high dielectric strength, and resistance to molten metals. 100% Asbestos-free. Has 3 times the insulative ability as asbestos. It can be cut, folded, or even wrapped around sharp corners. Ideal for high temperature applications and electrical insulation. Since ceramic paper melts at 3200°F. and offers a continuous service temperature of 2300°F., use it for high-temp. gaskets; combustion, furnace, and induction linings; handling molten metals; brazings; heat treating; metal forming operations; electrical insulators; expansion joints and shock absorbers. A design engineer's and hobbyist's delight. Kit includes 8 sq. ft. Edmund Ceramic Paper (1/32" thick), 4 oz. jar ceramic adhesive, instructions, and application ideas. **No. 71,920 $15.00 Ppd.**

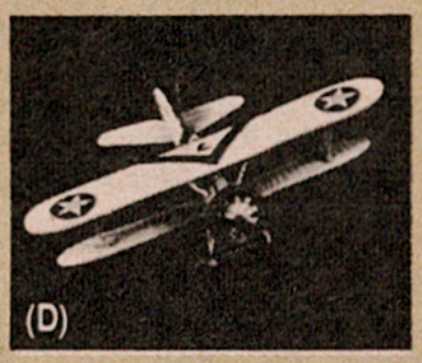
How's Your Gee-Haw Whimmy Diddle? Your Flipper Dinger? Bull Roarer?

What are we talking about? Natural folk toy kits of yesteryear that kids and Dads love to make and play with like they used to in the "good old days". Here are 3 low-priced kits that provide everything you need: native raw material (Blue Ridge Mountain wood, dried river cane, mountain laurel, etc.); cord; wire; easy instructions; and folklore. Make (1) a Gee-Haw Whimmy Diddle . . . notched sticks with propeller that spins when you rub the notched stick. Reverse its direction by rubbing differently (static electricity or vibration works it we think); (2) a Flipper Dinger . . . little blow pipe that launches a ball that you try to hook on a loop; and (3) a Mountain Bull Roarer . . . a swing toy that makes a loud wind sound. They're neat and fun for ages 7 & up. All you need is a penknife and a little cuttin' & puttin' together time. **No. 71,956 $4.75 Ppd.**

Four New Holograms Available!







4½ x 4½" framed acetate. **$8.95 Ppd. Each.**

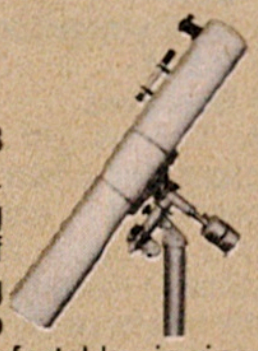
(A) Human Heart. Dissected view of the left atrium and ventricle. **No. 42,103**

(B) Human Brain. A 3-D image of the midsagittal section of the brain. **No. 42,104**

(C) Foot. Model of the skeleton of the right foot in a standing position. **No. 42,105**

(D) Airplane. A projected image (in front of acetate) of a model airplane coming at you. **No. 42,106**

Flash! Edmund Telescopes Now Include Strap Mounts



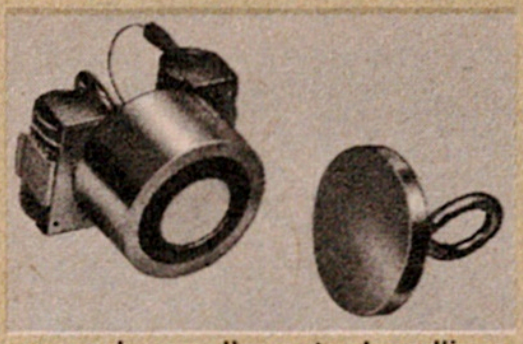
Our 4¼, 6 and 8" Reflectors, plus our 3 & 4" Refractors now are strap mounted. That means more accurate balancing around the declination axis of each of those fine instruments. Strap mounting also enables you to rotate the tube to bring the eyepiece into the most comfortable viewing position for all angles of viewing. Great for astrophotography. We've just added this improvement, so the descriptions on pages 62, 63 & 66 haven't yet been changed to include this info., but each scope mentioned above is now strap mounted.

Conversion Kits for Previous Edmund Telescopes

Update your telescopes. It's easy and quick. Kits have strap mounts, hardware, and instr.

For 4¼" Reflector & 3" Refractor **No. 42,108 $3.00**
For 6" Reflector & 4" Refractor **No. 42,109 $3.00**

Giant Electromagnet Lifts Over 350 lb.



This Edmund Electromagnet can be the answer to your most demanding lift activities. Plate or pipe handling, scrap separation, ferrous traps, heavy structurals, ferrous contaminant removal, small parts handling, and more. Lifting in excess of 350 lb., this tiny, yet strong device gives you a lift, no-lift (or drop) capability by simply stopping the current provided by 2 "D" cells (not incl.). Great for science class demonstrations, shows electromagnetic theory. Strong cold rolled steel with eye bolts at each end. Size: 2⅛ x 3" dia.; wt.: 3 lb. **No. 71,936 $29.95 Ppd.**

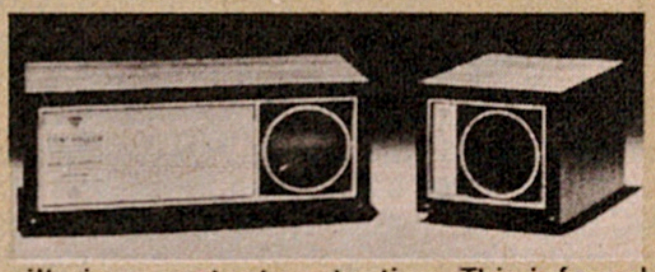
Small Electromagnet lifts 100 lb. Great for school demonstrations. Uses 1½v flashlight battery. 4½ x 2½" dia. Wt. 2 lb. **No. 60,435 $15.25 Ppd.**

Magnetic Goodies . . .

Collect magnetic goodies to decorate your refrigerator, auto dashboard, bulletin board, etc. Soft, safe, flexible and colorful note holders made of magnetized vinyl that hold tightly to any ferrous metal. Wide variety of cartoon characters, witty sayings, and novelty signs. Stick 'em everywhere there's metal surface. Trade with your friends. Teachers can give them away as rewards or incentives. You'll love 'em.

Pkg. of 36 No. 71,955 $7.50 Ppd.

Build Your Own Infrared-Type Security System



What can you do to help protect your home, store, or office? Install an electronic alarm system which will give constant protection. This infrared security system kit compares with systems costing much more and it's a great do-it-yourself project for electronic hobbyists and students. It's easily assembled in about 8 hrs. and features an infrared filter for near "invisible-light" operation, an internal high-frequency alarm that emits a piercing sound, a range of up to 75 feet between lamp source and detector, and a mode switch that lets you use the unit as a door announcer as well as for intruder warning. Simple step-by-step instr. show how to assemble components, chassis, and good looking cabinets (walnut-grained plastic). The detector system features a precision optical lens and infrared sensitive photocell that operates on 3 "D" batteries (not incl.). The lamp unit features a step-down transformer, infrared lens and is powered by a 110-120v line cord. Infrared light beam is invisible, but if you look into the lamp source you can see a red I.R. glow. Also has mounting brackets, dual range lamp switch, internal-external alarm switch, and sensitivity control. Are you protected?

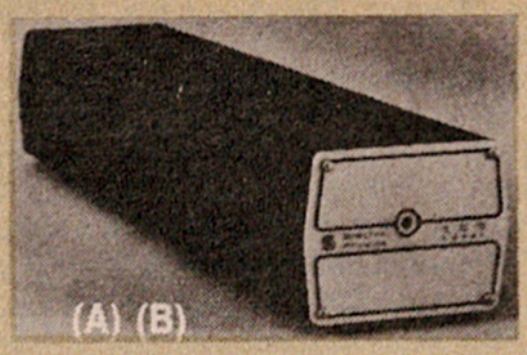
No. 71,957 $39.95 Ppd.

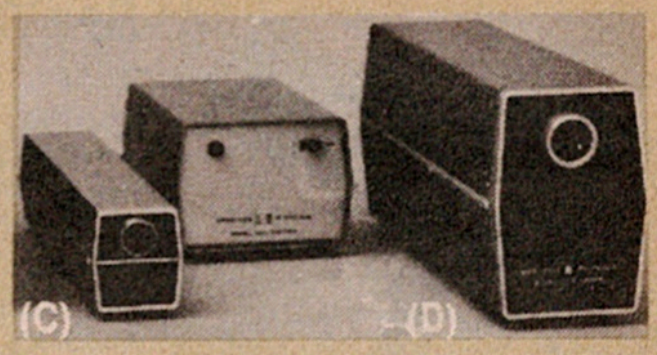
FREE Bulletin No. 9901 "Surplus Movie Camera Lenses"—30 bargain priced lenses . . . some new, some used—all good condition. Telephoto; wide angle; super 8, 8 and 16mm, and more. **FREE Bulletin No. 9900** . . . Listings of over 36,000 microscope slides of the world famous J. D. Moller . . . medical, diatom, etc.

THE ITEMS ON THIS PAGE ARE NOT IN INDEX.

Just Arrived! Just Arrived! Just Arrived!

Now . . . Spectra Physics HeNe Lasers





We're happy to announce that in addition to our economy line of He-Ne lasers, we can now offer you 4 super-quality He-Ne lasers manufactured by Spectra Physics . . . all backed by an 18 month manufacturer's warrantee. Each features: 1) Guaranteed output power stability. 2) Internal mirror plasma tubes with over a 10,000 hr. life. Require no cleaning or alignment. 3) Cold aluminum cathodes for automatic, self-starting and long life. 4) Low noise and ripple plus excellent long-term amplitude stability. 5) TEMoo mode, 632.8 nm. 6) Humidity-resistant window seals. 7) Dielectric mirror coatings.

(A) 0.5mW Laser For Schools & Industry . . . $99.50
A 0.5mW minimum with 1.0mW maximum power so it conforms to the proposed regulations on lasers for school use. Great for all educational applications and for alignment. TEMoo; beam dia: 0.88mm; divergence 1m Rad. Built in power supply. 115v AC. 2.6 x 3.5 x 14.8".

	No. 79,070	**$ 99.50 Ppd.**
220-240v 0.5mW Laser	**No. 79,071**	**$135.00 Ppd.***
0.5mW Repl. tube for above	**No. 79,072**	**$ 86.00 Ppd.**

(B) 1.0mW Laser . . . Just $125.00
Similar to above but 1.0mW minimum output. A top-quality, dependable lab Laser at a low, low price.

	No. 79,073	**$125.00 Ppd.**
220-240v 1mW Laser	**No. 79,074**	**$150.00 Ppd.**
1.0mW Repl. tube for (B).	**No. 79,075**	**$106.00 Ppd.**

(C) 2.0mW Laser for Industry and Holography
Widely used in labs, alignment and system applications. The laser tube and power supply are separated and the head is designed to easily fit into an optical system or bench. Head mounting plate mates with standard 13.6mm rods. All in all a medium-power flexible laser system. TEMoo; 0.9mm beam dia.; 1.0m Rad divergence. Head: 2.3 x 2.6 x 13.6"; Power Supply: 3.6 x 4.5 x 8.5". Wt. 8.4 lb.

	No. 79,076	**$330.00 Ppd.**
220-240v 2mW Laser	**No. 79,077**	**$375.00 Ppd.**
2.0mW Repl. Tube for above.	**No. 79,078**	**$181.00 Ppd.**

(D) 4.0mW Laser For Industry and Research
Single self-contained unit for portability. Great for laser applications requiring high power. TEMoo; 0.8mm beam dia; 1.1m Rad. divergence. 115v AC. 3.9 x 5.5 x 15.6". Wt. 4 lb. A beautiful, reliable, high-power laser.

	No. 79,079	**$465.00 Ppd.**
220-240v 4.0mW Laser	**No. 79,080**	**$530.00 Ppd.**
4.0mW Repl. Tube for above.	**No. 79,081**	**$291.00 Ppd.**

Parallax-Free Optical Sighting Scope Illuminated Sight

Great as a finderscope for astronomical telescopes. Especially useful for eyeglass wearers as it has infinite eye relief. We have taken a surplus navy gunsight (high quality optics) and adapted it for use as a completely parallax-free optical sighting device. A series of lighted concentric rings are projected onto the target. Position of the eye is not critical. Integral elevation & azimuth adj. for final alignment. Contains green bright light filters to flip into position as needed. Uses 1 "D" cell (not incl.); light level controlled by built-in rheostat. 3½ x 5 x 5½" high. Wt. 1.25 lb. Instr. incl.

No. 71,929 $20.00 Ppd.

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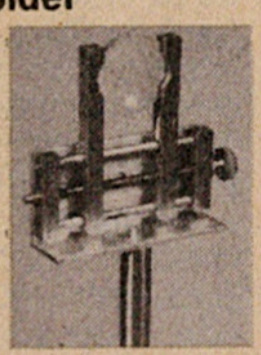
95 lb. Lift Ceramic Magnet With Handle

Lifts in excess of 95 lb. Plastic wire handle on top of 2 ceramics sandwiched between steel plates. Fits into hand easily (no finger stress). Tie a line on & use it in your favorite lake. Pays for itself many times over. It's strength will fascinate you. Great for scrap metal & tool recovery. 1 x 5/8 x 4". **No. 42,095 $4.00 Ppd.**

50 lb. Lift Ceramic Magnet With Handle. As above, but has one ceramic. **No. 42,094 $3.00 Ppd.**

Now Available . . . Component Holder



Self-centering variation of type we use in our own lab. Accomodates circular items such as lenses up to 55mm. Slotted jaws (3mm wide x 4mm deep) for holding filters, ronchi rulings, items 50 x 50mm (2 x 2") or standard 35mm slide mounts. Vertical or horizontal use with ¼-20 tapped holes 90° for easy adaptation to most optical benches. Quality material; aluminum base, brass jaws and steel lead screws. **No. 42,114 $12.50 Ppd.**

A New Supplement On Solar Home Heating

Dr. Harry E. Thomason, renowned builder of Solar Heated Homes, has now written a supplement. "Solar House Heating & Air Conditioning Systems . . . Comparisons & Limitations" deals with the world's most successful solar heating systems. Updated material on solar heat collectors, costs & distribution of heating, floor plans, locations, etc. There's also a section on the future of solar homes in America. A timely publication in the midst of a national energy crisis. 8½ x 11"; pprbk. **No. 9463 $5.00 Ppd.**

Plastic Fiber Optics In Color

Make fiber optics trees, fish tank displays, any accent light. Artistically combine colored fibers for floral arrangements, wall decorations, craft and hobby creations. Fibers transmit white light unless tipped with Fiber Bright. About 300 fibers in a 17" spray with metal collar at one end. Light flows out end of fibers. **Each $5.25 Ppd.**

Red **No. 71,961,** Yellow **No. 71,962,** Blue **No. 71,963**

Miniaturized High Intensity Light Source. Includes universal mounting disc and four filters for changing colors of fiber tips. **No. 71,964 $5.50 Ppd.**

Fiber Bright. Liquid plastic stain for coloring & shining fiber ends to transmit colored light. Doubles brightness of fibers, eliminates color filters. 1-dram bottles of red, yellow & blue. **No. 61,033 $4.50 Ppd.**

Miscellaneous New Optics

PCV 51mm dia. -56mm F.L.	**No. 94,763**	**$2.50 Ppd.**
PCX 51mm dia. 64mm F.L.	**No. 94,764**	**$3.50 Ppd.**
DCX 42mm dia. 53mm F.L.	**No. 94,762**	**$3.00 Ppd.**
Pyrex Window. 1.083 x .040".	**No. 30,729**	**$1.00 Ppd.**

See In Total Darkness With I.R. Eye . . . Only $199.95

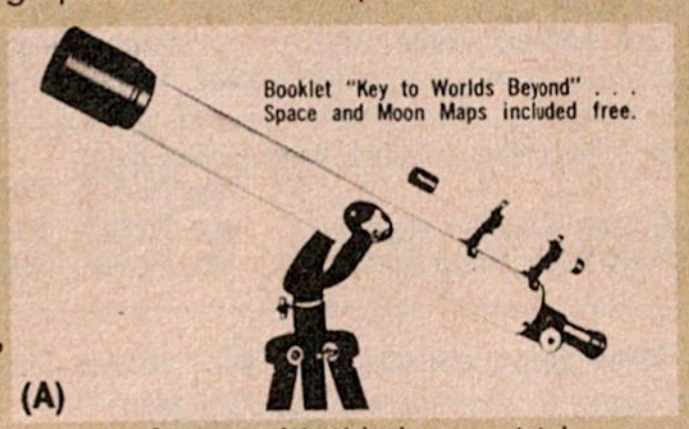
At last, a low-priced infrared viewer for crime detection surveillance, infra-red security system alignment, I.R. detection, night-time wildlife study, I.R. Laser checking . . . any work requiring I.R. detection and conversion to the visible spectrum. The Edmund I.R. Eye is a self-contained scope comprised of a D.C. power supply, 6032 Infra-red converter tube, f/4.5 objective lens, adjustable triplet eyepiece, shockproof plastic housing with handy pistol grip. Focuses from 10" to infinity. Operates on 6 or 12v DC (plugs right into your car cigarette lighter with included adapter). Not equipped with its own infra-red light source, the I.R. Eye can still be used for I.R. surveillance if area has been I.R. lighted. Or, make your own I.R. source using our I.R. filter No. 60,033 (pg. 157). A real buy at this low price. You'll be amazed at it's bright 7X image & fine resolution. Wt. 3 lb. 14 oz.; 11 x 14¼ x 3".

(Not for sale to residents of California) **No. 1648 $199.95 Ppd.**

New Refractor Telescopes For Aspiring Astronomers

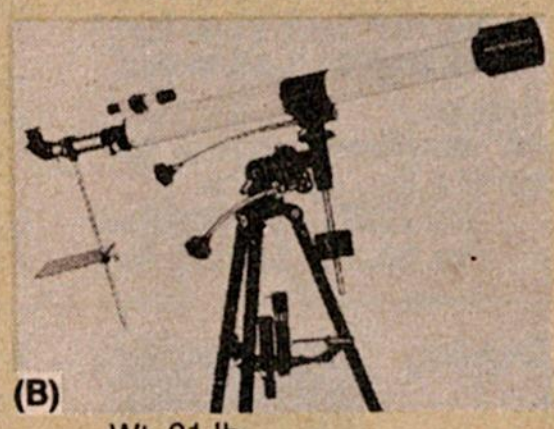
There have been many requests for additional refractor telescopes and we've finally found some beauties. These fine Japanese telescopes boast fantastic accessories and high precision optics. We do, however, feel the limited-field eyepieces (60mm) may affect the manufacturer's claims of high power. The normal power rule is 60X for each 1 inch of objective. Beyond this point experts feel the extra power will not be useful. (All powers listed below are manufacturer's estimates.) Our staff has tested them and feel the highly refined images and useful added features are just what you've been looking for.

(A) Low-Priced Star Finder Refractor
• 60mm (2.4 in.) Eyepiece
• 15X, 30X, 45X, 60X, 90X



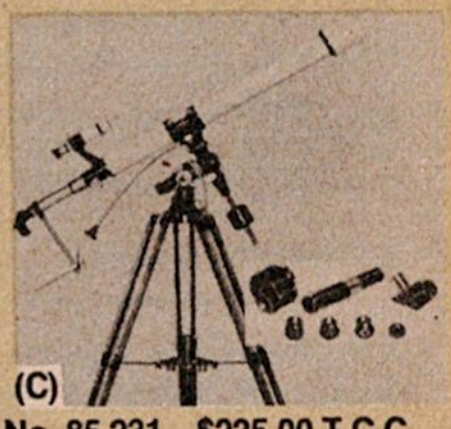
(A)

Take a bright view of stars with this low cost telescope. Great for earth-bound points of interest as well. Convenient focal length of 430mm; resolves to 2.5 seconds. Rack and pinion focusing, 4 x 15mm erecting finderscope, and an alta-azimuth mount are a few of the fine features. Adj. 30-54" all metal-tripod, bklt., space & moon maps also incl. **No. 85,233 $89.95 Ppd.**



(B)

Wt. 31 lb.
Clock Drive for Above **No. 85,231 $225.00 T.C.C.**
No. 71,959 $79.95 Ppd.



(C)

(B) Solarama Refractor
300X 60mm (2.4 inch) Eyepiece
39X, 78X, 50-150X Zoom, 300X

Trek through outerspace with visual thrills among the stars and planets. Zoom lens lets you go from 50-150 power as you scan down to 10.7 magnitude objects. Features include 900mm F.L., resolving power of 2.5 seconds, rack and pinion focusing, and an equatorial mount with 2 setting circles. Precision optical equipment incl. 6mm eyepiece and 6-18mm erecting zoom eyepiece with separable 23mm eyepiece; diagonal prism, sun filter, moon filter and sun projection screen; 5 x 24mm finderscope. Flexible slow-motion controls and a 54" metal tripod with accessory tray add to its stability. Shpg. Wt. 31 lb.

Clock Drive for Above **No. 71,960 $89.95 Ppd.**

(C) Super Solarama Refractor
500X 60mm (2.4 inch) Eyepiece
50X, 80X, 150X, 167X, 240X, 500X

Focus on far-out stars with this widely-acclaimed Super Solarama Refractor. With professional ease you can locate objects down to 10.7 magnitude with a resolving power of 1.9 seconds. Clean, detailed views of our neighboring planets are accomplished with smooth operation due to fine rack and pinion focusing. This beauty boasts optical features like interchangeable lenses; 6, 12.5, and 20mm eyepieces; diagonal prism; 3X Barlow; erecting prism; sun filter and projection screen; 6 x 30 finderscope; 1000mm F.L. Comes complete with equatorial mount, 2 setting circles, double indexing system, flexible slow-motion controls, and a heavy-duty wooden tripod with accessory tray. All neatly packed in a fitted hardwood case. Shpg. Wt. 42 lb.

No. 85,232 $399.95 T.C.C.
Clock Drive for Above **No. 71,960 $89.95 Ppd.**

Explore Innerspace

• Coral Reef Display
• Reef Investigation Set

The coral reef is the perfect example of a balanced natural habitat. Experience undersea adventure with these unique kits. **No. 71,467 illus.**

Build A Mini-Marine Diorama . . . Only $5.95. A diorama is a beautiful true-to-life display scene. With this unique kit you actually recreate a miniature coral reef in minutes. No artificial materials here . . . we've had our collectors dive tropical reefs for sea fans, gorgonia, coral & other sea "oddities." Simply arrange specimens in the 5 x 3¼ x 3" display case according to incl. instr., glue or implant them on styrofoam bottom; sprinkle delicate coral mix for authenticity, and create a marine masterpiece! **No. 71,966 $5.95 Ppd.**

Coral Reef Ecology Set—Through fantastic underwater photography, preserved specimens, and an excellent book, you will gain complete understanding of this "oasis in the sea." Incl. in the set is the full color, 112-pg. ppbk. book, "The Living Reef." 35mm color slides (15) identify common inhabitants & familiarize you with the surroundings. To expand your innerspace experience, we've included dried specimens and 2 diorama boxes (each 5 x 3¼ x 3") to let you mount, label & display these interesting forms of life. A super science project or classroom study unit! **No. 71,967 $19.95 Ppd.**

Beautiful Sea Shells of the Living Seas

A magnificent assortment of the world's prettiest sea shells. This collection has a variety of 20-25 large exotic shells gathered from throughout the world. To add to your enjoyment we've included a 64 pg. pprbk, "Shells and Shelling," one of the best guides on collecting for the whole family. Display shells separately, house them in shadow boxes, or build your own exhibit. Great for classrooms! Wt. 8 oz. **No. 71,965 $4.95 Ppd.**

ABOUT THE WEATHER . . . BE IN THE KNOW!

Barometers **Psychrometers** **Rain Gauges**

(L) Practical Rugged, Weather Station Can Put You In The "Pro" Class

With this kit you build a complete weather station that gives you the "know how" to check your predictions against press, radio, TV, and official meteorological stations. Quality materials give years of service.

Features a remote reading anemometer with windvane. Its indoor indicator board flashes neon lights to show wind speed and direction (at less than a penny a month cost for electricity). All connections are safe; safety power cord holds current to less than 1 ma.

Also includes sensitive air-tank barometer with 2-ft. indicator column; sling psychrometer that measures relative humidity; rain gauge with calibrated scale tube that measures to 1/100th of an inch; 100 ft. of lead-in wire; cloud chart; forecasting manual; and . . . everything you need for amateur meteorology. Excellent for science projects.

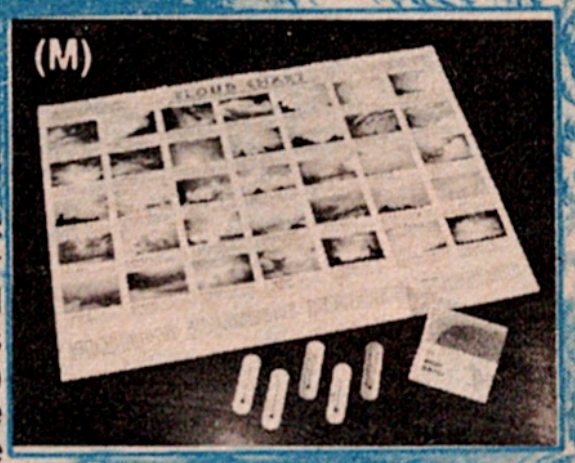
No. 71,022 $17.00 Ppd.

(M) Let Each Student Forecast The Weather With This Weather Investigation Kit

At last we have developed a kit to let students do their own weather forecasting. Most weather stations and accessories are great for observing daily conditions, but do not allow students to get involved in any activities. This kit gives each student a chance to record conditions, learn basic concepts, and then use this information to forecast coming weather. For initial temperature studies, there are thirty non-toxic 2" thermometers and thirty wind-chill charts. A large 17½" x 22½" color wall chart pictures thirty-five different sky conditions with thirty student size copies (17 x 11") provided for individual study. Once concepts are mastered, students use the fifty blank U. S. maps with master weather symbol keys to forecast the coming weather. Includes a detailed step-by-step teacher program for effective use of the kit in the classroom.

No. 71,847 $15.95 Ppd.

Pkg. of 200 Blank U.S. Boundary Maps
No. P-9122 $ 6.50 Ppd.



(N) Low-Cost Weather Balloons . . . see complete details on page 95.

(O) Low-Cost Indoor-Outdoor Thermometer

Read indoor & outdoor temps. from inside your home or classroom! Styron case with metal scale and 2 heavy magnifying thermometer tubes for easy reading. 4-ft. of capillary tubing. 9" tall.

No. 60,993 $6.50 Ppd.

(P) Jumbo 12 & 18" Dial Thermometers

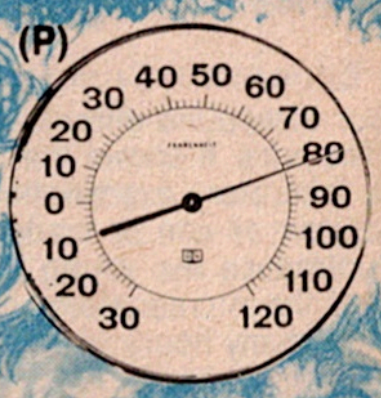
Large, bold, ¾" numerals, easily read from a distance. 12" range from -30 to 120° F.; 18" from -40°. Indoors or out. Permanent hanger attached to metal frame.

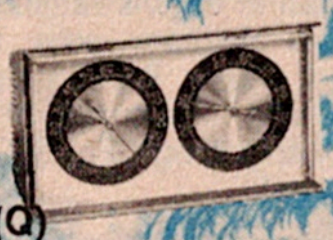
12" No. 71,591 $ 8.00 Ppd.
18" No. 80,184 $13.50 Ppd.

(Q) Low-Cost Thermometer and Hygrometer

Suitable for home, office or factory use. Accurately records the two measurements so essential to maximum comfort. For wall or desk use. Metal dials in plastic case. 2 x 3½ x 5½". Instr. incl.

No. 71,846 $4.95 Ppd.

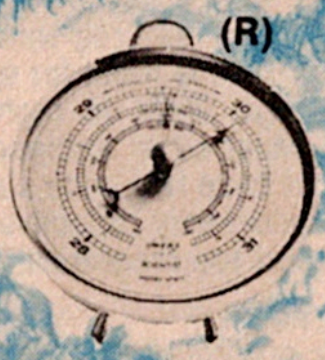




(R) Sensitive Holosteric Barometer

This accurate Barometer is perfect for school, laboratory or home weather station. As the atmospheric pressure on the barometer rises the weather outlook is good, but when it starts to fall the forecast is bad weather. The dial is calibrated in inches of mercury, centimeters, and millibars. Gilded case has a 4" silver dial with black numerals and gold set hand. Suitable for desk or wall. 1-yr. mfg. guarantee. Imported. Instr. incl.

No. 41,951 $9.50 Ppd.



(S) Anemometer For Wind Velocity

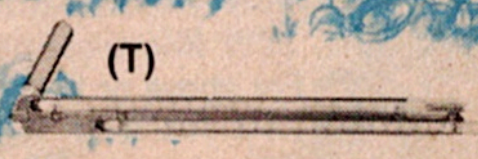
Measure wind speed anywhere, anytime with this portable, completely self-powered and self-contained Anemometer (no batteries needed). Just hold it in any wind current and read velocity directly (calibrated: 0-70, and 0-35 mph; 0-60 and 0-30 knots). Chart on back compares Beaufort scale, knots, & mph. 2 x 2½ x 5½" overall. Vinyl case.

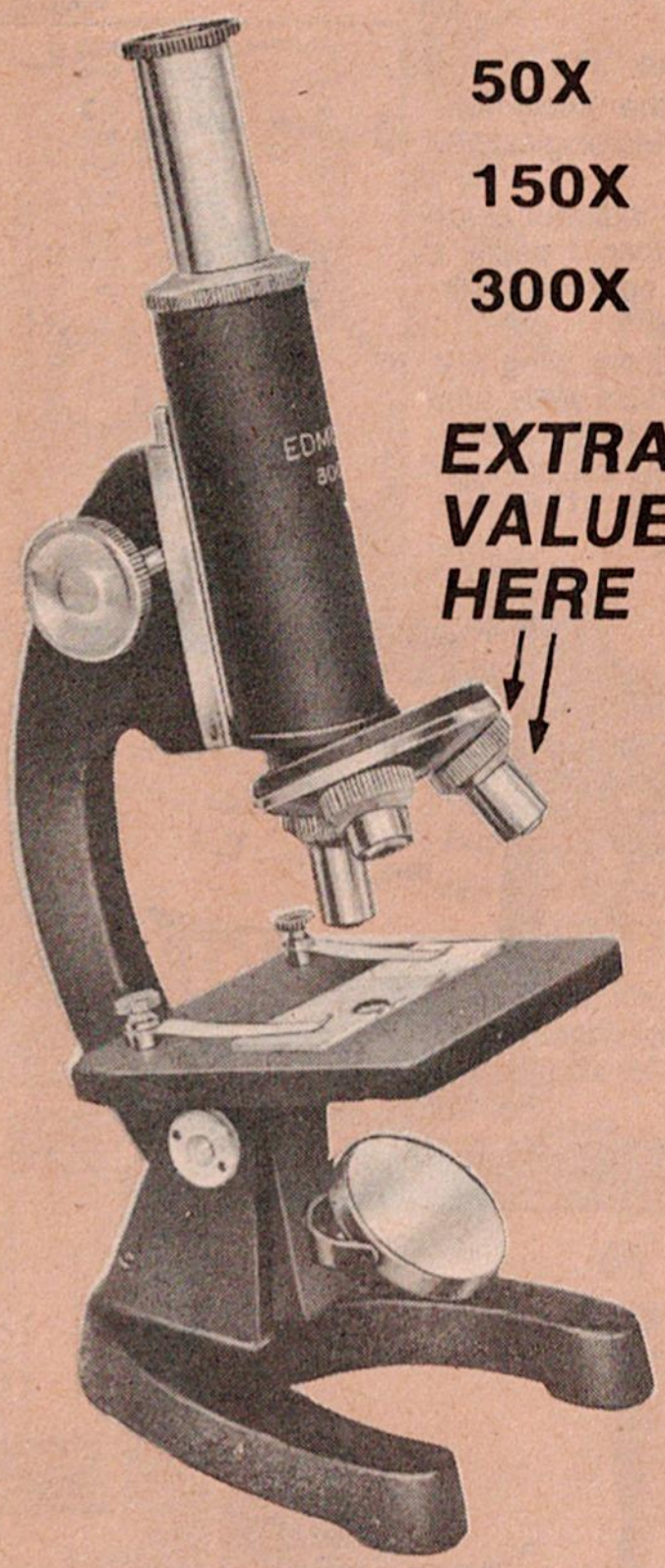
No. 60,946 $47.00 Ppd

(T) Sling Psychrometer

Just "sling" the hygrometer (contains wet and dry bulbs) and you can calculate the relative humidity. 9" tubes recessed in gray metal back. Folding swivel handle. 20-120° F. in 1° divisions. Relative humidity tables, wicks, and instr. incl.

No. 71,477 $22.25 Ppd.





GREATEST Low-Cost MICROSCOPE

- **Hours of fun and education . . . for only $36.00**
- **Wide Field.**
- **Quality construction for many school or industry uses.**
- **Superior Optical Performance Always**
- **Achromats Give Clear, Sharp Resolution**

- Three (5X, 15X, 30X) achromatic objectives on triple revolving nosepiece—10X eyepiece.
- Dual-knob, helical rack and pinion focusing.
- Metal construction over 10" high. Properly balanced, weighs over 2 pounds. Arm inclines for easy viewing.
- Complete with polished wooden carrying case.

Why Every Boy And Girl Should Own One!

Biology is so important in today's world it is now taught from elementary grades through the college level. Thus, the knowledge and pleasure gained from home experimentation with microscopes provides excellent background experience for every student, regardless of age, career or basic course of study selected.

Superior Optical Performance

A key reason why this low-cost microscope is rated so high is that it has 3 optically ground and polished, cemented, color corrected objectives containing achromats (5X has 1, 15X has 1 achromat & 1 simple lens, and 30X has 2 achromats & 1 simple lens . . . see sketch) . . . while other inexpensive units only have one, two, or three simple lenses for objectives.

An Educator's Comments:

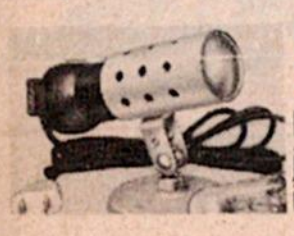
"Your compound microscope is an amazing instrument for the price. It shows the detail in organs satisfactorily. In a laboratory examination in histology, cells, nuclei, cytoplasm all can be made out clearly. It can satisfactorily introduce the young scientist to accurate observation of the microanatomy of living things. For $36.00 he will get many hours of enjoyment."

50 To 300X Magnifications Possible

This popular microscope features three useful powers, from 50X up to 300X. 50X is ideal for examining insects and other small things. 300X is high enough to see many bacteria, etc. Most other microscopes in this low price category do not have this wide a range of magnification. Also, a 50X accessory objective (below) is available to further increase top magnification up to 500X.

Objective Gives Your Microscope 500X

50X Achromatically corrected, 3mm F.L. Threaded for easy attachment to nosepiece. **No. 30,197 $7.75 Ppd.**



Low-Cost Hi-Intensity 20W Microscope Illuminator

For above or below stage use. Elbow joint for easy ajustment. 20w bulb incl. **No. 71,848 $5.95 Ppd.**

Unlimited Home Experiments Now Possible

This is the one unit anyone interested in microscopy would be proud to own; persons of all ages use it for practically any type amateur home research project. You can do detective work; detect tobacco cheapening, spot food adulteraton and bloodstains . . . perform fascinating experiments around the house with practically any object.

You can examine pond water droplets, grains of sugar, hair, textile fibers, salt, yeast, small living objects, etc. This microscope is an excellent basic tool for Science Fair Projects, Engineering Fairs, Future Scientists of America activities, and related projects performed by students at every level.

No. 70,008 Only $36.00 Ppd.

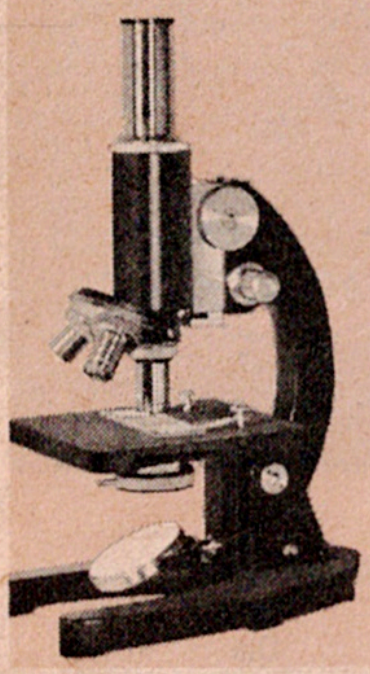
For added enjoyment, order Mechanical Stage No. 30,060 on page 88.

Beginner's Book— "Hunting With The Microscope"

A thrilling introduction to the microscope showing what to look for and how to go about it. Covers detective work, cells, blood, bacteria, molds, etc., even the raising of cultures. Pprbk, 125 pages (5½ x 8").
No. 9207 Only $2.25 Ppd.

EVERYONE SHOULD OWN A MICROSCOPE!

(A)



Gives 25X, 50X, 75X, 100X, 150X, 300X, 600X & 900X.

(A) Full-Size Model 11¾" High, 25X to 900X

Professional, monocular-type microscope of superior quality and workmanship. Excellent for school and college laboratories. Precision optics combined with sturdy medium-sized base.

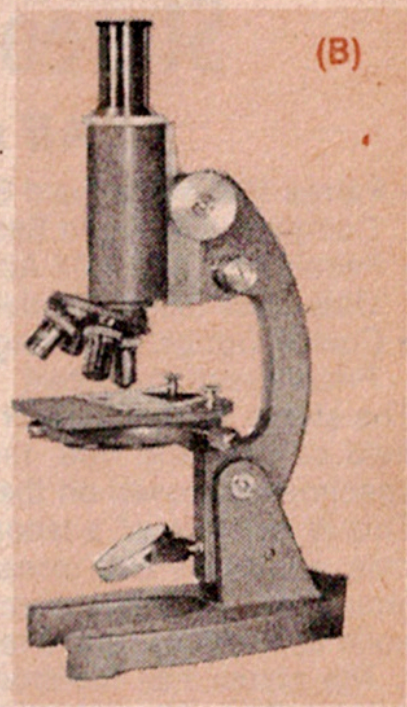
All optical elements are standard professional size. Objectives are parfocal. Automatic focusing stop prevents damage to objectives and slides. Fixed 160mm tube. Rack and pinion coarse focusing and fine micrometer type adjustments. Complete with 3 eyepieces and 3 objectives in fitted hardwood cabinet with carrying handle. Imported. Shpg. wt. 11 lbs.

No. 85,049 $125.00 Trans. Chgs. Col

Note: Attachable Substage Illuminator, No. 50,222, fits the mirror pin socket of the above microscope (described on page 87).

(B) Smaller Model, 10-7/8" High, 50X to 900X

(B)



Get 50X, 100X, 150X, 200X, 300X, 450X, 600X & 900X.

Precision-made, all metal microscope with dual-control, rack-and-pinion coarse and fine focusing adjustments. 3 eyepieces, 4 objectives on quadruple revolving nosepiece, centerable metal stage, 5-aperture disc diaphragm, plano-concave mirror, and fitted hardwood cabinet. An excellent instrument although eyepieces and objectives are not standard size. Imported.

No. 70,513 $99.50 Ppd.

Stock No.	Achromatic Objectives—	Eyepieces	Stage	Substage Equipment
(A) 85,049	Coated objectives 5X (0.10 NA), 10X (0.25 NA) 60X (0.85 NA); triple revolving nosepiece.	5X, Huyg. 10X, W. F. 15X, Huyg.	Bakelite, 4-5/16" x 4½"; two stage clips. Made to fit. No. 30,058 (page 126), also No. 30,060 (page 126).	Fixed-condenser lens, iris diaphragm, 1-7/8" dia. plano-concave mirror
(B) 70,513	Objectives: 10X, 20X, 30X, 60X; quadruple revolving nosepiece	5X, Huyg. 10X, Huyg. 15X, Huyg.	3-3/8" x 3-3/8" centerable metal stage complete with two stage clips.	Five-aperture disc diaphragm. 1-5/16" plano-concave mirror

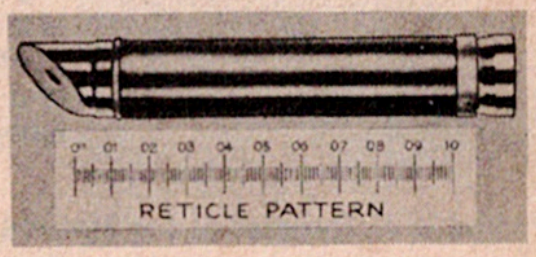
Low-Cost Quality Microscope . . . 50X, 100X, And 600X

Sturdy, all metal, microscope with excellent definition. Dual-knob, helical rack and pinion focusing; safety stop to prevent objective and slide damage; and inclining arm. 3 x 3½" black metal stage with 2 stage clips; click-stop diaphragm (6 apertures). 3 color free achromatic objectives (5X, 10X, 60X) on triple nosepiece with click-stops. 1-3/8" dia. double mirror (plano and concave). 11" high; with 10X eyepiece and objectives; Hardwood cabinet. Made in Japan. **No. 71,442 $68.50 Ppd.**

Achromatic objectives for above only.

20X	No. 41,504	$6.88 Ppd.
30X	No. 41,505	$9.45 Ppd.
40X	No. 41,506	$8.78 Ppd.

50X, Pocket-Size Direct Measuring Microscope



No longer than an ordinary fountain pen. Ideal for direct measuring and examining minute objects. Use for checking and measuring small parts, for quality control, to speed up production, to detect inferior merchandise, etc. Reticle is calibrated for measuring 1/10" by .001 divisions. Estimates to .0005" can easily be made. You make direct readings from reticle, no calculations necessary. Chrome reflector at base of instrument reflects light onto objects being examined or measured. Excellent for checking hi-fi needles. **No. 30,225 $15.00 Ppd.**

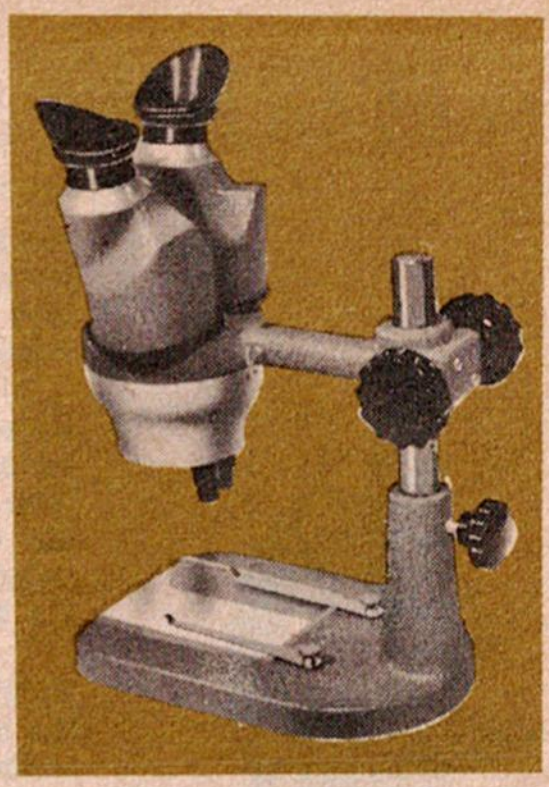
50X Microscope

Same as above except reticle is not included. Instructions included for adapting it to any camera for photomicrography. Gray enamel finish, 4-1/8 x 5/8" dia. **No. 30,013 $4.75 Ppd.**

Combined 50X Microscope and 10X Telescope . . . Ideal For Field Trips

Unique, combination quality pre-tested pocket microscope/telescope. As a microscope, enlarges 50X: examine hi-fi needles, insects, crystals, minerals, etc. Tilt to focus. Highly polished, metal reflector throws lots of light on object. As a telescope, unscrew reflector, draw out eyepiece, focus; distant objects look 10 times closer. Handy pocket clip; chrome and black finish. Much nicer and more useful than less expensive models with lower quality optics & reflector. **No. 30,059 $11.95 Ppd.**

High-Quality American-Made Stereoscopic Microscopes



All these Quality Features

- Paired 10X, Wide-Field Eyepieces . . . Complete with Light Shields
- Paired 2.3X And 4.0X Achromatic Objectives (see table below)
- Coated Optics, Including Porro Prism Erecting System
- Revolving Nosepiece
- Rack And Pinion Focusing
- Interpupillary Adjustment
- Aluminum Body and Cast Iron Base
- Removable Glass Stage With Clips
- Attractive Gray, Wrinkle Finish

The stereo microscope or wide-field binocular provides binocular vision, a large field of view and true, three-dimensional, erect image. In other words, when a specimen is moved on the stage, it moves in the eyepieces in the same direction. This is not true of a laboratory microscope where the image is inverted. Scientists, educators and research personnel prefer a stereo for observing whole objects such as small animals, embryos, insects, fruits, seeds or a whole organ such as a kidney, etc. Over 80X is rarely required.

The stereo has hundreds of applications in industry; among them are assembly, quality control, production line inspection, research. Rockhounds find the stereo useful in micromounting.

A stereo is, in reality, two microscopes side by side . . . with paired objectives, eyepieces and tubes. Two images are produced and combined into one in the same manner as the eyes accomplish it in normal vision. The three dimensional effect is more apparent in the lower powers from 3X to 40X. Stereos have long working distances and are ideal where work has to be performed on the object under the microscope.

Standard Optical Equipment

Objectives	Working Distance	Eyepieces	Field Dia.	Total Power
2.3X	3″	10X	.31″	23X
4.0X	2″	10X	.18″	40X

Standard Stereoscopic Microscope

With 10X paired, wide-field eyepieces; 2.3X and 4.0X paired achromatic objectives; rack & pinion focusing, horseshoe base, glass stage & stage clips; plastic cover. Shpg. Wt. 10 lbs. **No. 85,056 $120.00 T.C.C.**

Stereoscopic Microscope With Heavy-Duty Base & Long-Range Extension Arm

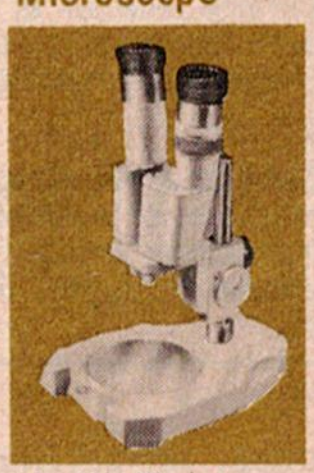
This unit has the same optical equipment (as No. 85,056) but is supplied with heavy base and extension arm (No. 85,040). This adds greatly to the stability and flexibility of the instrument and makes it especially suitable for industrial uses. Allows Edmund stereo microscope to swing 360° with a maximum diameter of 22″ in circumference; 14″ up and down excursion. The combined pillar and horizontal arm fitting has locking screws for each adjustment. Circular locking collar on pillar, permits arm to rotate freely. Hinged joint at end of the arm accepts the focusing post. (Lockable in any comfortable viewing positon.) Heavyweight cast-iron base, chrome plated steel pillar and arm assure a steady support for vibration-free images. Gray wrinkle enamel finished base. Shpg. wt. 46 lbs. **No. 85,161 $160.00 T.C.C.**

Paired W.F. Eyepieces for Stereos Above

Power	Total Mag.	Field Dia.	No.	Price/Pair
10X	23 & 40X	.31 &.18″	**30,214**	**$28.25**
6X	14 & 24X	.38 & .22″	**30,213**	**$22.50**
20X	46 & 80X	.22 & .13″	**30,217**	**$40.75**

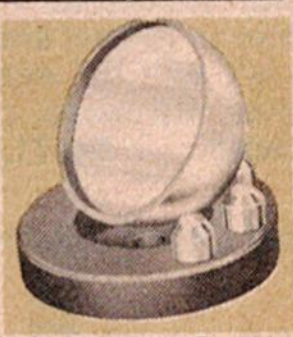
Low-Power Attachment with 10X eyepiece gives magnification from 6 to 22X with a field dia. from 1.5 to .34″. Get lower powers and wider fields of view with our stereos. Movable lens mount; maintains stereoscopic effect. **No. 30,276 $8.60 Ppd.**

Surplus Bargain . . . Stereo Microscope . . . 1/3 Price

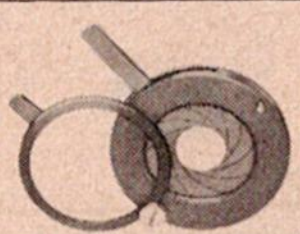


Manufacturer's surplus, fine imported stereoscopic microscope . . . while limited supplies last. Attractive lustre-coated metal construction with well balanced stand for sturdy, vibrationless use. Paired 10X Kellner eyepieces with rubber eyeguards and paired 3X color corrected objectives, give 30X overall. Left side focuses independently. Good definition; collimated; coated optics; long working distance (variable 1½-4″); interpupillary adj. 55-80mm; extends 9-13″ overall. Ideal for labs, collectors, hobbyists, craftsmen, inspectors, repairmen, students, etc. Use for erect image viewing of minerals, gems, small parts, coins, etc. Also features: removable diffusing plastic stage; helical rack & pinion for smooth focusing; lockable microscope head swings 360°. Wt. 3½ lb. **No. 71,621 $59.50 Ppd.**

Magnet Mounted Microscope Mirror



Front-surface, plane mirror housed in 1-9/16″ dia., steel hemisphere on magnetic base. Adjusts quickly & easily. Ideal for microscopes, precise positioning of laser beams, optical bench work, etc. Gives cone of light as big or bigger than built-in illuminators. Base's magnetic pillars assume steady 3-point contact. Mirror rotates for 0-90° to plane of base. Mount horizontally or vertically. Patented. **No. 40,753 $20.00 Ppd.**



Substage Iris Diaphragm

Quality built iris diaphragm & filter holder. Blued steel leaves in brass mount. Aperture: 1-25mm. Swing-in holder for filters 32mm dia. x 1½mm thk. Threaded shoulder 28mm dia., 5mm pitch. **No. 40,997 $9.95 Ppd.**

See other iris diaphragms on page 135.

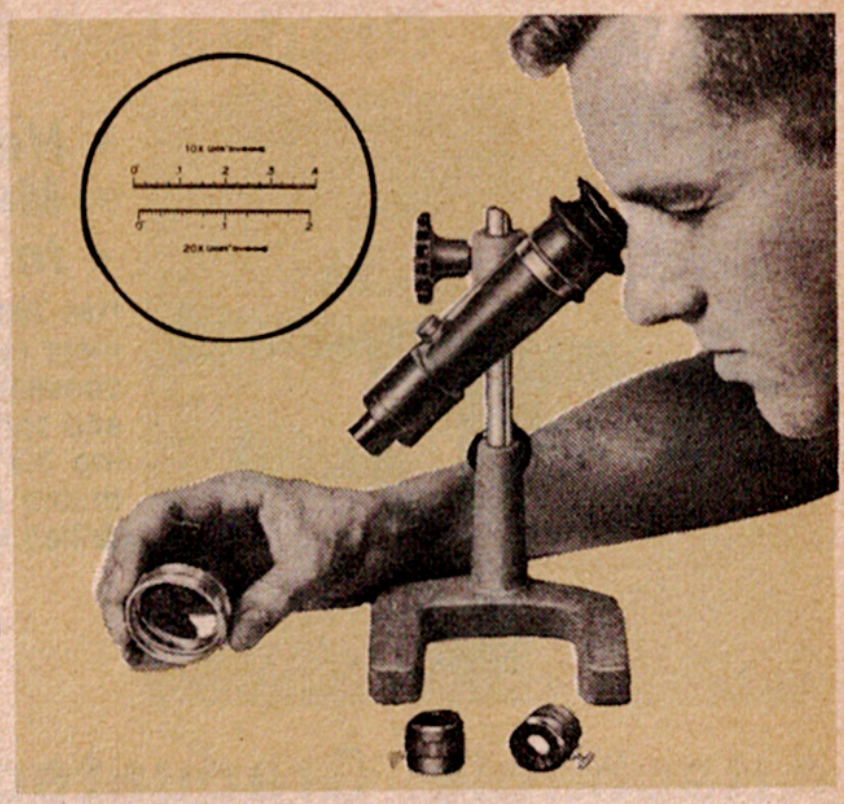
MORE SURPLUS BARGAINS CAN BE FOUND ON PAGE 21.

Measure Directly With Erect Image Low Power Microscope—6X, 10X & 20X

Only initial calibration required!

- Direct-Reading Scales
- Separate Scales From 10X And 20X
- Most Optics Low-Reflection Coated
- Wide-Field Eyepiece With Light Shield
- Horseshoe Base And Stand

SPECIFICATIONS		
Total Power		
6X	10X	20X
Working Distance		
8.9"	3.5"	1.73"
Field of View		
1.12"	.47"	.24"



- **Seed and plant inspection**
- **Textile examination**
- **Stamp and coin collecting**
- **Termite inspection**
- **Engraving and printing**
- **Dissecting of insects**
- **Inspection of paint**
- **Examination of grains of sand**
- **Examination of snowflakes**
- **Rock and mineral collecting**
- **Microcard reading**
- **Repairing watches**

In manufacturing this American-made microscope, we have adapted an expensive, sturdy, war-surplus optical instrument. For only $43.50, you get an $85.00 value.

Tool rooms, lab, inspection departments, and printing shops are but a few places where it can be used. .4" scale with .005" graduations for use with 10X; .2" scale with .0025" graduations for use with 20X.

The image is erect and objects appear to move in the eyepiece in the direction they do under the microscope. Excellent color-correction optical system. Basic 6X scope includes achromatic objective and wide-field eyepiece. Rubber eyeguard shuts out extraneous light. Other powers of 10X and 20X are provided by accessory lenses mounted in cells that slip over the basic objective. The cell, providing 20X total magnification, contains an expensive achromat that insures better detail under this power. Dual-knob, rack and pinion focusing has 3½" excursion. 8" high vertical pillar can be raised another 3" and locked in position. Distance between the microscope objective and table top can be varied from 1-1/8" to 7-1/2".

2-lb., cast iron, horseshoe base 4½ x 4½". Microscope complete 4 lb. Instr. incl. **No. 70,266 $46.95 Ppd.**

Stand only. Horseshoe base, post, and focusing arm **No. 50,192 $14.25 Ppd.**

Accessory Objective for 30X. Working distance 5/8". Field 3/16". (Reticle not usable.) **No. 30,293 $6.50 Ppd.**

LOW-COST 50X MICROSCOPE FOR DIRECT MEASUREMENT TO .001"

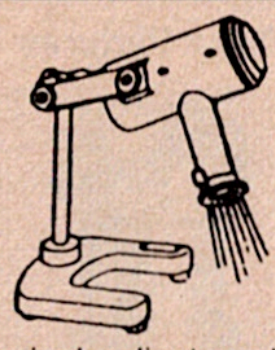
High Power . . . Accurate . . . Portable

Powerful, pocket size scope with glass measuring reticle (scale) is mounted in clear plastic base . . . ideal for direct linear measurement and examination of minute objects. Use for quality control, speed up production, detect flaws, scratches, inferior merchandise. Excellent for surface measurements of metals, fibers, printing. Linear scale: 1/10" long, .001" divisions.

Easy to carry in pocket or tool chest; stands only 4" high has 1½" O.D. base, weighs only 2 oz. Base of transparent Lucite admits plenty of light to scale and work, keeps instrument in sharp focus. Can be focused and locked.

Scope can be removed from base and used alone with incl. chrome reflector. Reflector throws light onto objects being examined or measured. **No. 60,465 $17.50 Ppd.**

All-Purpose Illuminator



This all-purpose illuminator meets exacting microscopy at a price within reach of lab budgets. Daylight and ground-glass filters provide even glare-free illumination; fingertip control varies intensity. Converts properly for Kohler and opaque illumination. Wide latitude of mechanical adjustment satisfies most common requirements and provides even wider use in general laboratory or other applications, such as inspection and quality control. Sturdy, cast iron base, 4½ x 4½", with 5½" pillar. Complete with lamp and 6-ft. cord with plug and on-off switch.

No. 15,000 $57.00 Ppd.

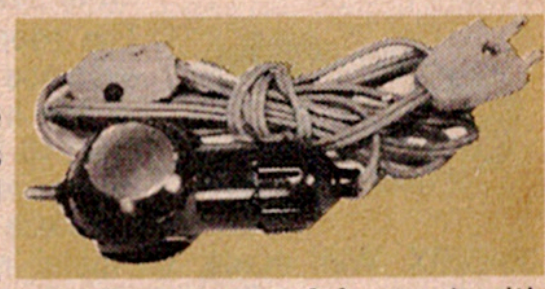
Replacement Lamp **No. 15,005 $ 3.30 Ppd.**

Polarizing Filter Set For Your Microscope

See birefringent materials (chemical crystals, bone, muscle, cellophane, Mylar, etc.) make color transformations under polarized light. 2 disc set.

No. 2721 $1.50 Ppd.

Plug-in Substage Illuminator



Plugs into substage mirror socket. Has daylight, white and ground glass filters. Equipped with 115v, 15w, single-contact, screw-base lamp, 6-ft. cord with plug and on-off switch. **No. 50,222 $15.00 Ppd.**

Lamp for old No. 15,001, 15,002. **No. 15,006 $1.50 Ppd.**

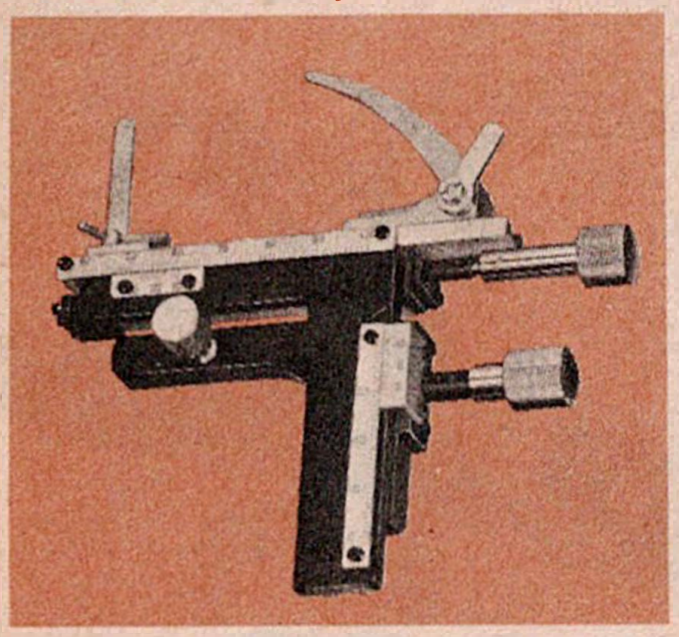
Lamp for old No. 15,004. **No. 15,007 60¢ Ppd.**

Multi-Purpose Illuminator

A 20-watt bulb illuminator designed to reflect light on microscope mirrors. Blue filter simulates daylight. Double elbow adjustments for any position.

No. 71,859 $12.95 Ppd.

Precision, Graduated Mechanical Stage



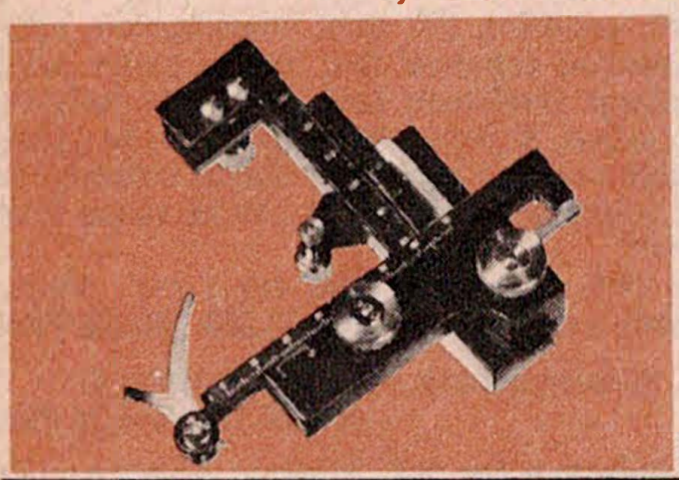
- ***Helpful in Relocating Slide Fields***
- ***Make Low-cost X-Y Positioner***
- ***In Stock***

Has 30mm front to back and 50mm left to right excursions. Fixed verniers read to 0.1mm. Dual control knobs, horizontally positioned, are conveniently located on right side. Slide holder with adjustable arm and spring clip accepts both small and large glass slides, max. opening 3¼". Unit finished in black and chrome. Two locating pins and thumb screw attach to microscope stage. The latter can easily be drilled to accommodate it. Adapt for low-cost x-y positioner.

No. 30,058 $58.25 Ppd.

(Stage on Edmund Microscope No. 85,049, listed on page 85, is drilled and tapped for this unit.)

Attachable, Graduated Mechanical Stage



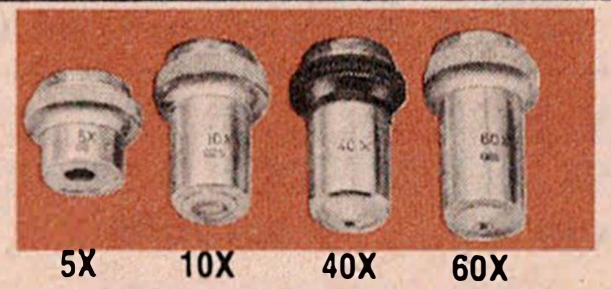
Fits Microscopes With Stages Up To 10mm Thick

Sturdy, attachable, graduated mechanical stage with 35mm front to back and 65mm left to right excursions. Has fixed verniers reading to 0.1mm. Dual control knobs are comfortably positioned. Spring finger holds standard 3 x 1" microscope slides. Will fit microscopes No. 70,008, 85,049, and others with stages up to 10mm thick.

No. 30,060 $29.25 Ppd.

Achromatic Objectives

(Standard Microscope Size Diameter and Thread)



Excellent for both visual and photomicrographic use. Give remarkably crisp image, free of residual color. All are designed for tube lengths of 160mm and cover glass thicknesses of 0.18mm.

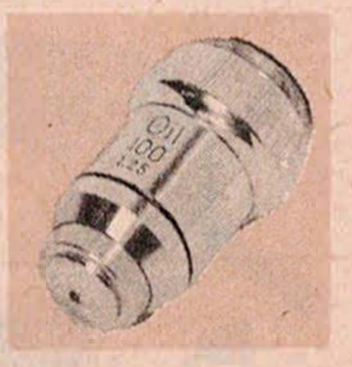
No.	30,045	30,046	30,047	30,048	30,049
Power	5X	10X	20X	40X	60X
N. A.	0.10	0.25	0.4	0.65	0.85
Price, Ppd.	**$10.50**	**$16.95**	**$19.95**	**$21.50**	**$34.50**

ZOOM Eyepiece For Microscopes

10 to 20X At Twist Of Dial

The zoom eyepiece eliminates eyepiece changing—combines in one handy eyepiece powers from 10-20X. Merely insert it in proper microscope like regular eyepiece and immediately get 30-200X. Well made, all metal mount, heavily plated, anodized—zoom fits any standard .917" dia. microscope tube. Adj. clamping ring insures tight, mar-free attachment. Overall length 2¾", max. dia. 1½", wt. 5 oz. Coated. **No. 60,270 $56.75 Ppd.**

Oil Immersion Lens . . .

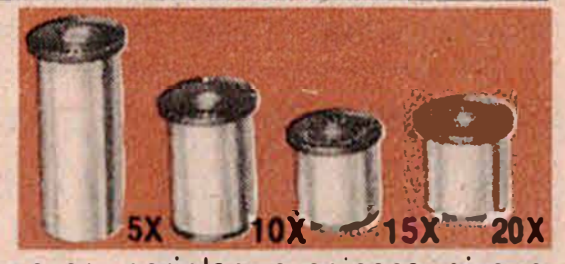


Only $53.95 Ppd.! Less than half of what you'll expect to pay. 100X, 1.25 N.A., standard thread, spring loaded retractable nose (prevents damage to slide or objective), black band. A very good buy!

No. 41,670 $59.95 Ppd.

Microscope Eyepieces

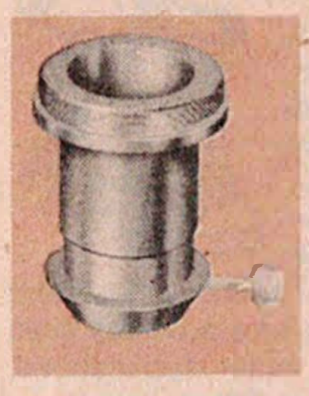
(Standard .917" dia.)



Huygenian eyepieces are most commonly used. However, periplan eyepieces give a flatter field and are excellent for use with achromatic and apochromatically corrected objectives (recommended for photomicrography, particularly with eyepiece cameras.) Each is precision made of fine optical glass. (**) Huygenian: (*) Periplan (†) Coated.

No.	Power	Price, Ppd	No.	Power	Price, Ppd.
30,126	5X	**$9.95****	**30,130**	20X	**$29.25**
30,128	10X	**$9.95****	**30,131**	25X	**$30.25**
30,129	15X	**$10.75****			

Take Pictures Through Your Microscope



Attach this Microscope/Camera Adapter to your "T" adapter, SLR camera, and microscope and master photomicography. Adapter fits and locks on eyepiece tubes up to 0.991" O.D. Microscope eyepiece fits through Adapter which attaches to "T" adapter connected to your camera. Instr. incl.

No. 41,100 $9.00 Ppd.

"T" Adapters to connect above to SLR cameras:

Camera	No.	Price	Camera	No.	Price
Pentax	**41,489**	**$4.36**	Miranda	**41,492**	**$4.46**
Nikon	**41,490**	**6.00**	Minolta	**41,493**	**6.00**
Exakta	**41,491**	**6.00**	Canon	**41,819**	**9.20**

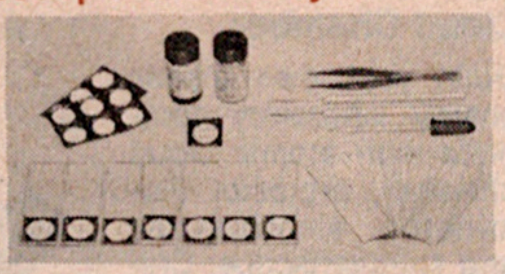
For other adapters write our Sales Eng. Dept.

"Techniques of Microphotography" precision photography, 32 pages, 8½ x 11". **No. 9105 $1.25 Ppd.**

Photography Through The Microscope: 80 page guide. 8½ x 11". **No. 9103 $2.50 Ppd.**

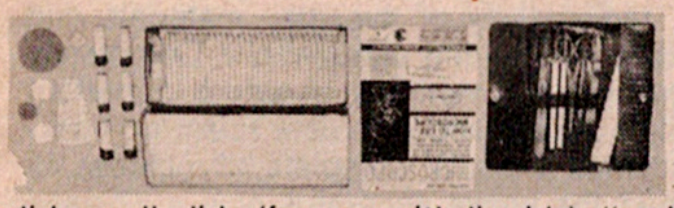
BIOLOGICAL STUDIES REQUIRE A QUALITY MICROSCOPE.

Bargain-Priced Microscope Accessory Kit



Seven 1 x 3″ prepared slides: amoeba, coccus, volvox, lilac, sunflower, hydra, spirogyra; 12 blank slides; 12 cover glasses; 12 labels; Canada balsam cement; methylene blue for staining; medicine dropper; forceps; 2 dissecting needles. **No. 70,861 $3.00 Ppd.**

Edmund's Own Microscope Accessory Kit



Kit includes book, "Hunting with the Microscope," prepared slide, well slide (for use with liquids), "make-your-own" slide kit of glass slides, cover glass and balsam, polarizing filter set, stains, shrimp eggs, instr.

No. 70,504 $15.50 Ppd.

Prepared Slide Set

A very nice introduction to life origins. 18 beautiful slides and 48-pg. booklet (3 x 3½″) that explains each. Typical slides: Fruit Fly, Plankton, blood, Amoeba, Paramecium, etc.

No. 41,745 $10.00 Ppd.

Misc. "Make Your Own Slides"

Standard 1 x 3″ Prepared, Labeled Slides

Vegatable Slides (12 per box)	**No. 40,006**	**$3.25 Ppd.**
Animal Slides (12 per box)	**No. 40,007**	**$3.25 Ppd.**
Microscopic Organisms (12/box)	**No. 40,008**	**$3.75 Ppd.**
72 Plain Glass Slides, 1 x 3″	**No. P-40,001**	**$1.75 Ppd.**

100 Slide Cover Glasses. 18mm sq. Class 1 (.17mm thickness) **No. P-40,002 $2.25 Ppd.**

Well Slides. 2 depressions on each slide protect specimens from damage by tight cover glass. Also perfect for water drop preparations and micro cultures. Package of 12 **No. P-30,091 $5.75 Ppd.**

"Make Your Own" Slide Kit

Asst.: 30 pieces of 1 x 3″ slide glass, 30 cover glasses, and vial of balsam cement. **No. 40,260 $4.25 Ppd.**

1 oz. Cana. Balsam Cement **No. 40,004 $1.25 Ppd.**

Precision Stage Micrometers

Measure to 0.0001 In. And 0.002MM. Each slide ruled on glass and inserted into 26mm x 76mm black anodized metal mounts. Ruled area has protective cover glass. Suitable for use with oil immersion objectives.

With **linear scale 0.005″ long,** graduated in 50 parts each measuring 0.0001″ and numbered every 0.001″.

No. 30,592 $24.50 Ppd.

With **linear scale 0.1mm long.** Graduated in 50 parts, each measuring 0.002mm. **No. 30,593 $24.80 Ppd.**

Imported Stage Micrometer

One millimeter line, divided into 100 parts (0.01mm) Size 1 x 3″. **No. 30,036 $12.25 Ppd.**

Microscope Camera

An instrument camera you can modify to use on microscopes and telescopes. Mounting diameter is 1-3/8″. Incl. 2 film holders, a glass crosshair screen, a 6X magnifier. **No. 71,766 $45.00 Ppd.**

Microscope Eyepieces—Standard .917″

Power	Type	Stock No.	Price Ppd.
6X	Huygenian (Japan)	**41,892**	**$7.50**
10X	Wide Field (German)	**41,893**	**15.00**
8X	Huygenian (German)	**41,894**	**7.50**
16X	W. F. Ortho.; coated	**41,896**	**18.00**
5X	Projection	**41,890**	**9.00**
10X	Micrometer reticle 10mm scale divided into 100 parts marked every .1mm	**41,898**	**20.00**

Microscope Objectives

Standard size, designed for use with 160mm tube lengths; German-made; excellent workmanship.

Power	N.A.	Stock No.	Price Ppd.	Comments
10X	0.30	**41,908**	**$10.00**	
10X	0.30	**41,906**	**12.00**	
10X	0.30	**41,903**	**18.00**	Retractable Nosepiece
20X	0.45	**41,905**	**25.00**	
45X	0.65	**41,899**	**20.00**	
45X	0.65	**41,904**	**33.00**	Retractable Nosepiece
100X	1.30	**41,909**	**40.00**	Oil immersion

Set of 2: (10X div. obj. N.A. 0.30; 43X retractable nose N. A. 0.65) **P-60,963 $60.00 Ppd.**

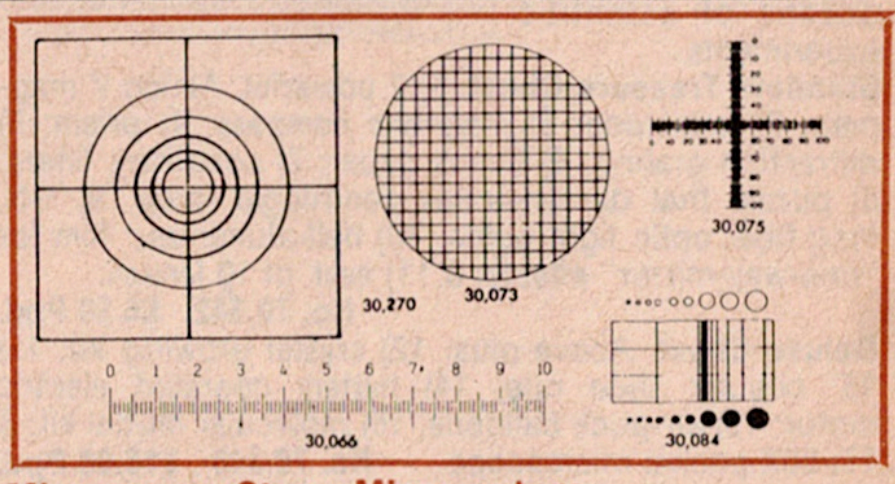
Set of 3: (10X div. N.A. 0.30; 45X N.A. 0.65; 100X N. A. 1.30) **P-60,962 $100.00 Ppd.**

Microscope Eyepiece Reticles . . .

Standard 21mm In Dia. (.825″) 1.5mm Thick

No.	Description of Pattern	Price, Ppd.
30,101	With 0.1″ scale in 100 parts	**$9.75**
30,110	With 0.5″ scale in 100 parts	**9.75**
30,081	1mm horizontal scale in 100 parts	**9.75**
30,068	5mm horizontal scale in 100 parts	**9.75**
30,066	10mm horizontal scale in 100 parts*	**9.75**
30,072	0.25mm squares inside 10mm dia. circle; each 10th line is heavier	**9.75**
30,073	0.5mm squares over entire field*	**9.75**
30,111	1mm squares over entire field	**9.75**
30,076	Crossline scales; 5mm in 100 parts	**9.75**
30,075	Crossline scales; 10mm in 100 parts*	**9.75**
30,070	Crosslines; standard rulings	**9.75**
30,071	Crosslines; fine rulings	**9.75**
30,077	Concentric circles; 0.5mm to 12mm	**9.75**
30,079	Protractor	**9.75**
30,083	Patterson globe & circle (air pollution)	**17.50**
30,084	Porton reticle*	**17.50**
30,270	Fairs type No. 3*	**17.50**

*Illustrated at right.



Microscope Stage Micrometers

The following 8 reticle scales, each mounted on 1 x 3″ standard glass slides, are protected with a cover glass.

No.	Description of Pattern	Price Ppd.
30,133	10 millimeter scale in 100 parts	**$14.50**
30,085	5 millimeter scale in 100 parts	**14.50**
30,476	2mm and .1″ in 200 parts	**14.50**
30,088	1mm square in a 100 part grid, numbered horizontally, lettered vertically	**14.50**
30,593	0.1 millimeter scale in 50 parts	**24.80**
30,086	0.1″ scale in 100 parts	**14.50**
30,592	0.005″ scale in 50 parts	**24.50**
30,036	1mm scale in 100 parts (Japan)	**12.25**

War Surplus Cross Hair Reticle, 40mm dia. 3.5mm thick, $10.00 value **No. 30,645 $5.00 Ppd.**

SCIENCE PROJECTS

Science Project Ideas

FREE! Bulletin 9847, "Your Science Project," shows how to think creatively. Lists sources for ideas.

"150 Science Experiments Step-By-Step" by J. Viorst. Covers chemistry, physics, biology, weather & numbers. Grades 6-10. 180pp. **No. 9456 75¢ Ppd.**

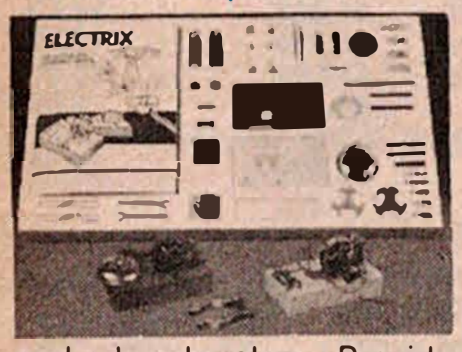
"700 Science Experiments For Everyone." Ideas compiled by UNESCO. How to create clouds in a bottle, weigh the air, etc. Many with household materials. Hardbound, 200pp. **No. 9301 $4.95 Ppd.**

"Junior Science Projects." Illustrated experiments and projects in electronics, physics, optics, astronomy, etc. Ages 9-18. 192pp. **No. 9397 $3.95 Ppd.**

"Science Fair Experiments" by Byron Wels

43 unusual Science Fair projects for jr. and sr. high school students. Topics include air pollution, heredity, rocketry, chemistry, etc. Tips on what to build, how to approach a project, what catches a judge's eye, supplies, etc. Each project can be used as is, or as a starting point for creative variations. 5½ x 8½"; 146pp; hdbk; illus. **No. 9435 $6.95 Ppd.**

Electrix® Experiment Kit . . . 140 Experiments!



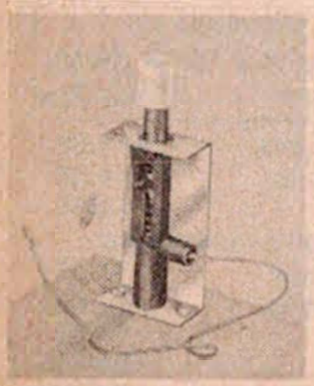
Weeks of fun and learning! Explore electricity, magnetism, etc. Send messages with your own Morse code buzzer; produce electricity with a real generator; make an operational telephone system, an electric motor, and a burglar alarm. Provides a meaningful perspective of the modern uses of electricity. Illus. 112-pg. manual (8½ x 11") clearly explains usage of over 135 precision components. Safety approved. 4 "C" cells required (not incl.). **No. 71,647 $17.95 Ppd.**

Science Treasure Chests

Worlds of fun and excitement for any youngster of elementary, junior high, or high school age. Chests incl. instr. for dozens of scientific experiments.

Standard Treasure Chest: 1) 2 powerful, Alnico V magnets; 2) lodestone; 3) magnetic compass; 4) prism; 5) diffraction grating; 6) litmus paper; 7) polarizing filters; 8) puzzle that demonstrates centrifugal force; 9) 1-ft. long fiber optic light guide; 10) half-aluminized film for "one-way-mirror" effects; & 11) asst. of 10 lenses. **No. 70,342 $5.50 Ppd.**

Deluxe Chest. Above plus: 12) crystal growing kit; 13) 15" circular slide rule; 14) battery operated electric motor; 15) air-puck balloons; 16) molecular model kit; & 17) 50X pocket microscope. **No. 70,343 $15.00 Ppd.**



15,000 Volt Pushbutton

A push of the button gives you a large ¼" spark every time . . . ignite gas flames, stoves, welding equipment, etc., safely! The 5" high spark generator, wire with push-on terminals, and small neon lamp make a simple low-cost demonstrator for the production of electricity by piezo-electric effect. Great for schools, labs & experimenters. Instr. incl. **No. 41,723 $5.95 Ppd.**

Atomic Energy Lab Kit With Cloud Chamber

Build your own atomic energy laboratory complete with atomic cloud chamber, projector illuminator, electroscope and spinthariscope. Create cosmic ray showers and actually track their vapor trails in the cloud chamber. See exploding atoms with the spinthariscope. Make auto-radiographs. Check ionization and radioactivity of everyday materials and the included alpha source and uranium ore. Completely safe! Experiment with the wonders of nature. A perfect educational gift to arouse and stimulate scientific interest. Great for science projects. Complete kit includes 43 parts to construct the above apparatus plus a 22-page instruction booklet with 8 suggested experiments and the theories behind them. **No. 70,899 $14.75 Ppd.**

Preserve Intricate Beauty of Snowflakes

Collect a gallery of art in every snow flurry . . . a fascinating winter hobby shown in National Geographic (Jan. 1970). Catch & study the delicate crystals that have long mystified & intrigued scientists. Preserve countless intricate patterns for home or school study. 1¾ oz. preservative; glass rod; magnifier & instr. incl. **No. 40,530 $2.00 Ppd.**

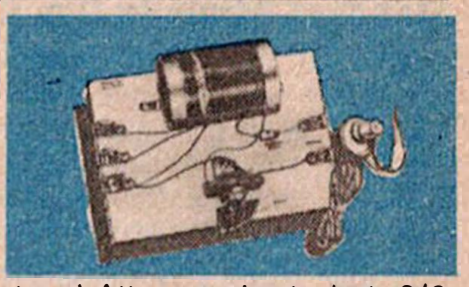
"Snow Crystals" by Bently/Humphries. Over 2,450 photos of snow crystals. Describes problems & photo techniques. Pprbk. 8 x 10¼": 228 pp. **No. 9352 $4.95 Ppd.**

Experimental Optics Kit

"The Best Introduction to Optics We Know!"

Perform dozens of optical experiments and demonstrations. Kit includes: 10 assorted lenses (with small edge chips or other minor flaws, but perfectly usable for project work); 5 double convex lenses; prism; diffraction grating; 2 polarizing filters; rotating Star Finder chart; 2 x 2" magnifier; and 3 illustrated project books. **No. 50,204 $6.50 Ppd.**

Crystal Radio Kit



Build a modernized working model of the original crystal radio . . . receive 1 or more stations . . . features variable capacity tuning. An operating set can be made in an hour or less! All parts included: 3/8 x 4-3/8 x 6-3/8" base; high-Q tuning coil; germanium diode; variable condenser; radio parts; earphone; and instr. **No. 71,513 $6.95 Ppd.**

"Metal With A Memory"

Bend into any shape, apply heat, it reverts to original form! Variety of 6-pieces of 55-Nitinol. Corrosion resistant, non-magnetic, low-density. Instr. incl.

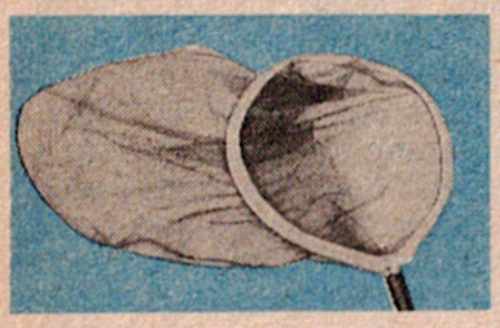
No. 41,388 $5.00 Ppd.

96-pg. NASA Nitinol Book. No. 9116 $1.00 Ppd.

MORE EDUCATIONAL ITEMS CAN BE FOUND ON PAGES 79-81

ENTOMOLOGY

A study of the properties and vital phenomena of the insect world . . . a branch of biology comprised of 700,000 different varieties . . . a fascinating and rewarding hobby for persons of all ages. Edmund has an introductory kit and accessories for hobbyists, students, and collectors.



Butterfly and Insect Nets

For butterfly and insect collecting enthusiasts: These beautiful units are each constructed of heavy duty, quality nylon netting.

Heavy Duty Butterfly Net: For those in the intermediary stages, this net has a 30" handle and deep, extra strong nylon netting. Wt. .9-lb. On colorful 11 x 22" informative card in poly bag. **No. 71,519 $2.50 Ppd.**

Insect Collecting BARGAIN Kit!

A basic butterfly and insect collecting and mounting kit for the budding naturalist. A real good value, this new kit contains all of the parts needed to start a beautiful butterfly or invertibrate collection. Exciting, educational family fun! You get 3 x 5" spreading board; 2-oz. bottle dispatching fluid; eye dropper; relaxing fluid; butterfly net with wooden handle; 2 butterfly specimens; 10 #3 insect mounting pins; 20-pp. illus. booklet. **No. 71,518 $4.95 Ppd.**

Accessories For Good Collecting

Spreading Board	5 x 12"	**No. 71,523**	**$2.25 Ppd.**
Insect Mounting Pins	Size 1	**No. 30,652**	**$1.00 Ppd.**
Insect Mounting Pins	Size 2	**No. 30,653**	**$1.00 Ppd.**
Specimen Forceps Set	(3)	**No. 41,607**	**$1.00 Ppd.**
Dispatching Fluid	2-oz.	**No. 41,604**	**$1.25 Ppd.**
Relaxing Fluid	2-oz.	**No. 41,603**	**$1.25 Ppd.**
Riker Display Mount	8 x 12"	**No. 71,521**	**$3.75 Ppd.**
Riker Display Mount	12 x 16"	**No. 71,527**	**$4.95 Ppd.**

Water That Climbs Uphill

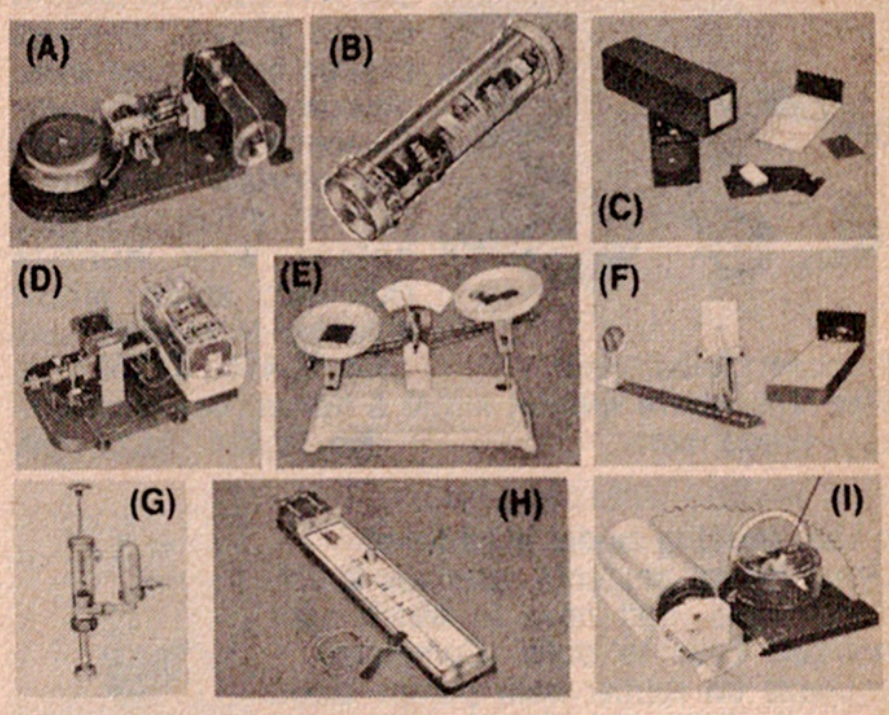
Add a small amount of Anti-gravity Friction-reducing Additive to glass of water. Mix well. Spill some out into another glass and watch contents flow up and syphon into bottom container. To stop flow, cut with scissors. Watch it snap back. A dramatic demonstration that will amaze you and your friends. The secret is the additive's long molecular structure that reduces friction. Water can be pumped farther with less pumping pressure. A 3 oz. can makes 84 pints of elastic anti-gravity solution. Additive (approx. 3 oz.) and instr. incl. **No. 41,086 $2.00 Ppd.**

NOT AVAILABLE

Digital Counter Kit With 3 Integrated Circuits

Build electronic devices for science fairs . . . even a 1-digit decimal counter! Incl.: 3 I.C.S.'s (7490 ripple counter, 7475 4-bit latch, 7447 BCD to 7-segment encoder); pins; drilled circuit board; 7-segment readout; instr. No. experience nec., just soldering iron & power supply. **No. 41,760 $15.25 Ppd.**

Fun Kits That Teach Scientific Concepts . . . Safe . . . Easy-To-Build



(A) Electric Bell. Build a push-button bell, electrical buzzer, or telegraph key. **No. 41,284 $2.70 Ppd.**

(B) Visible Flashlight Kit. **No. 41,285 $2.70 Ppd.**

(C) Camera & Prism Kit. Build & experiment with a working pinhole camera. **No. 41,290 $2.70 Ppd.**

(D) Electric Motor. Learn how motors really work by building one! **No. 41,286 $2.70 Ppd.**

(E) Weight Measurement. Make a double-platform balance. Has metric weights. **No. 41,289 $2.70 Ppd.**

(F) Lens & Light Kit. Convex & concave lenses to bend light, project images, etc. **No. 41,287 $2.70 Ppd.**

(G) Hydraulic Pump. Build many kinds of working pumps! Shoots water 25 ft.! **No. 41,288 $2.70 Ppd.**

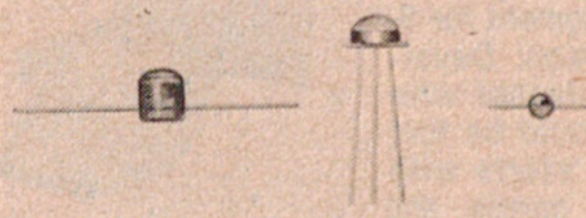
(H) Sound & Music Kit. Construct a 2-string instrument & experiment w/harmony. **No. 60,942 $2.70 Ppd.**

(I) Electrical Measurement & Conductivity Kit. Build a galvanometer. **No. 60,943 $2.70 Ppd.**

All 9 Kits A-I **No. 71,765 $21.49 Ppd.**

Discover The Magic And Mystery Of Electronics In Minutes . . . With Blocks!

Solid-state building blocks you simply arrange into working electronic circuits . . . no soldering, wiring, tools or special knowledge needed. Place 2 blocks together & magnetic connectors make safe, electrical connections. Blocks contain transistors, diodes, earphones, etc.; electronic symbols identify each. Learn the basics of electronics! Make Morse Code sender, DC-to-AC converter, metronome and more working projects. Kit includes an 80-pg. manual with easy-to-follow, symbol-keyed diagrams & instr. Requires 9v battery (not incl.).
20 Project Kit **No. 71,177 $13.00 Ppd.**



Light Emitting Diode Experiment Kit

Test the amazing LED's . . . the little solid-state monochromatic lamps that use low-voltage DC and can last up to a million hours. They are used in alpha-numeric readout in calculators, watches, indicator lights, etc. Our kit features 3 LED's (gallium arsenide—MLED600, MV50, similar to MLED930; 2 visible red emitting, 6600Å & 1 infrared emitting, 9000Å); plus a 1 ft, 20-mil plastic fiber-optic light pipe; & instr. **No. 41,597 $5.95 Ppd.**

Create Optical Illusions W/Whirling Wonders

See . . . colors in black & white discs, shapes change before your eyes, objects that aren't there. Demonstrate hypnotism and pioneer "movies"! (20) 5" discs; battery holder with built-in rheostat; small motor mounted on bracket; bulb & socket; & instr. incl. **No. 70,414 $10.50 Ppd.**

Disc Set. Above without motor & holder. Use your variable-speed motor. **No. 70,424 $4.25 Ppd.**

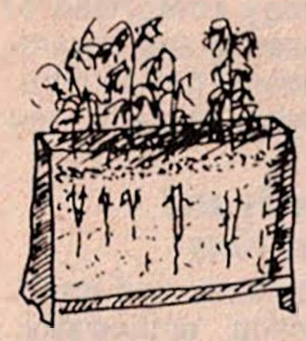
The Visible Pumping Heart . . .

a real working model in kit form!

Great kit for students, teachers & science depts. that have to watch their budget! Easy to build. Completed, a squeeze on rubber bulb pumps blood through visible chambers to body parts & then returns it to heart . . . with life-like continuous action! Plastic parts, tubing, "blood coloring", & instr. 9 x 11" h. **No. 71,838 $4.75 Ppd.**

Self-Watering Root-view Growing Kit

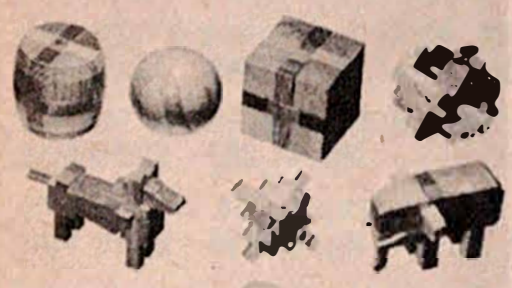
All Year Round Classroom Garden



Now you can teach plant science the easy way. This growing kit is practically an "instant" teaching unit (just add water). You get everything you need: wooden planter, plastic viewing windows, 3 pkgs. of seeds (onion, carrot, and radish), timing marker, soil mix, and complete instr. Planter's slanting design forces roots to "hug" the window side for perfect viewing. Great for demonstrating how roots develop in various soils, water and fertilizers. See daily effects from seed to harvest. No more waiting or digging for results. Also includes 48-pg. book "A Child's Garden." Helps teachers and children learn together. Has teachers guide, songs, experiments, questions and answers. Topics cover root-view gardening, importance of organic matter, regeneration, etc. 12 x 5½ x 9"; wt. 5-lb. **No. 71,788 $17.50 Ppd.**

You'll find many more growing items and plant science experiments on pages 44-48!

"BRAINBUSTERS"



12 Quality Hardwood Puzzles

Here is a brainteasing assortment of wood puzzles that will provide hours and hours of pleasure. Included are 12 animals and geometric forms to take apart and reassemble. Special design gives the whole family a chance to test their skill, patience, and most important of all, their ability to think and reason while having fun. Excellent amusement for recuperating youngsters. Largest: approx. 3½ x 2½". **No. 70,205 $7.25 Ppd.**

Set of 6 of above puzzles. **No. P-71,515 $4.10 Ppd.**

Chess^{3}® . . . Play Chess In 3-D

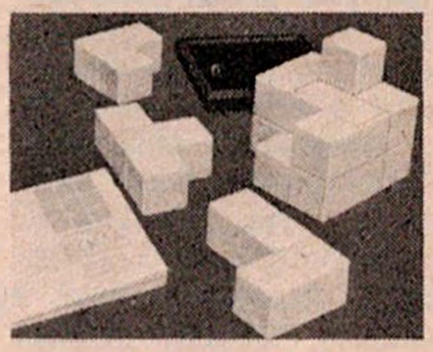
A new multi-dimensional form of the fascinating game of chess. Requires the cunning and strategy of regular chess in a 3-dimensional challenge. Moves can be made up and down as well as normally on the same plane. Old-timers and novices alike find the game more exciting than ever! An attractive sculpture in chrome steel enhanced by three 8" sq., crystal clear playing boards. Overall size: 8 x 10¾ x 12" high. Chessmen and instr. incl. **No. 71,685 $14.00 Ppd.**

WFF'N Proof

21 games of modern logic . . . unadulterated enjoyment for 8-yr. olds to logicians. Developed by Yale professor who thinks learning should be fun, this 21-game kit starts with relatively simple games and ends with subtle games to challenge intelligent adults. Gives practice in abstract thinking and mathematical logic . . . complex as chess, exciting as poker. 5¾ x 8½" case stores logic cubes, playing mats, timer & 224pg. instr. **No. 60,525 $8.95 Ppd.**

WFF'N Proof Equations. 5-game kit of creative math for grades 1-12. **No. 60,526 $5.00 Ppd.**

TheOriginalSoma®. . .

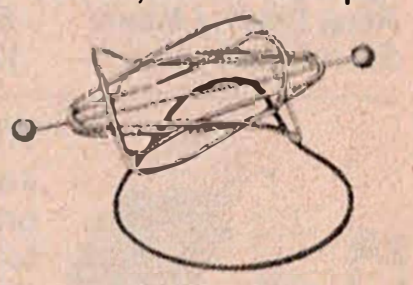


A set of cubes in irregular combinations (no 2 alike). 240 simple ways & over 1 million mathematically different ways in which the 7 Soma® pieces make a 3-3/8" cube. Instr. **No. 41,527 $2.75 Ppd.**

The Oscillitron

Befuddling & bequiling . . . it shows the unusual characteristics of a 4" dia. hemispherical mirror. A fluorescent ball hangs from string on arm of stand. As ball oscillates it quickly causes 4 types of reflections: darting in & out, changing size, upside down . . . it drives you crazy! Try it under black light. Instr. **No. 41,624 $1.95 Ppd.**

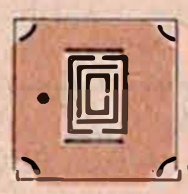
Conquer The Loony Loop . . .



Or go crazy trying. The Loony Loop Puzzle is scientifically engineered to provide entertainment for anyone from 7 to 70. A simple nylon band on a maze of rigid wire loops—but can you get it off? If you can remove and replace the band in one hour, you're a genius. Try your skill—it only takes eight moves. 5½" long. Solution incl. **No. 60,817 $2.50 Ppd.**

20 Twisting, Tangling, Teasing Puzzles

Twist them, turn them, tangle, and untangle them . . . if you can. Kit contains temper-teasers like the Ring O' Seven, Twisted Nails, Ring & Coil, Heart & Horseshoes, and 14 others of brightly-finished heavy-gauge metal. You also get the classic "T" and a 4-piece Square Problem . . . 20 puzzles in all! Instr. incl. **No. 71,164 $6.00 Ppd.**



Mercury Puzzle

A fun puzzle for learning about mercury. Mercury can't escape. **No. 40,384 89¢ Ppd.**

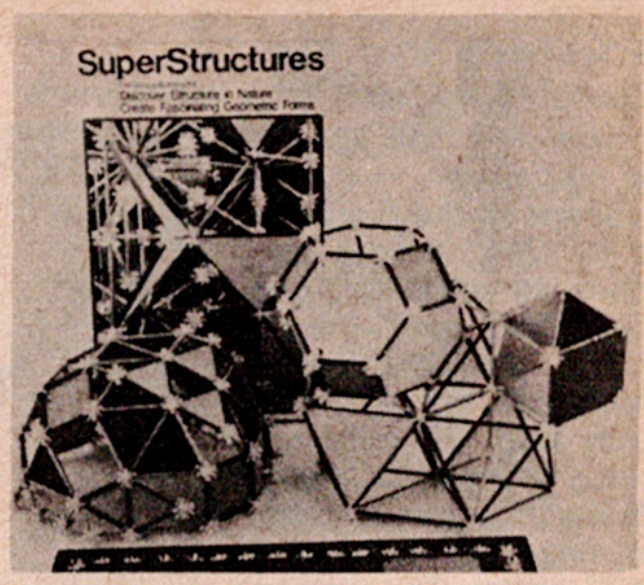
Pkg. of 10 No. P-70,583 $8.25 Ppd.

GROW A GIANT GERANIUM, SEE PAGE 48.

Super Structures®. . . for easy-to-build fun

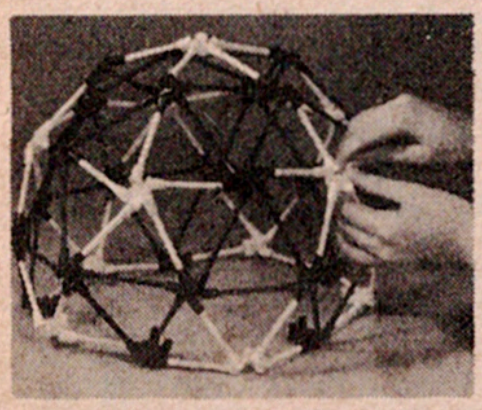
• Zany animals • Basic structures • Complex molecules

A unique building kit designed so you can learn while playing! Based on modular structure principles found in nature. Fascinating as a toy or educational tool (ages 4 to adult). The key is its patented connector "node" (star-like plastic unit with 26 spokes: triangular, square, & rectangular). Series of 3 corresponding hollow plastic branches fit on nodes' spokes and combine to form an endless variety of 3-D structural frameworks. "Polypanels" fit on these frameworks to enclose or divide space. Easy fun to build with, color coded. Node approx. 1-1/8" dia; branches 1-3/8" to 5½". Illus. Instr.



128 Piece St. 24 nodes; 89 various branches; 15 polypanels.
No. 71,782 $8.75 Ppd.

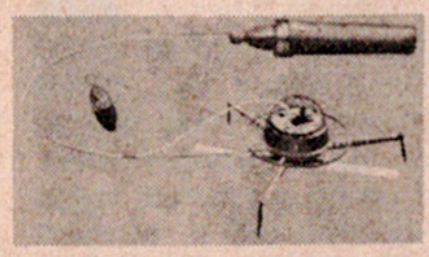
300 Piece Set. 48 nodes; 200 various branches; 52 polypanels.
No. 71,783 $15.95 Ppd.



Geodesic Dome Kit

Build Models of the Future

Build and study model geodesic domes . . . the strong, lightweight, simple, beautiful, and graceful structure invented by R. Buckminster Fuller. Experiment with these sperically shaped structures of triangular faces that may be the ecological dwellings of the future. Kit includes everything you need: over 100 color-coded wood struts; 42 spoke hubs; and 18-pg. booklet describing geodesics with instructions for models and full-size construction. **No. 71,583 $9.75 Ppd.**



Soft Landing Lunar Bug

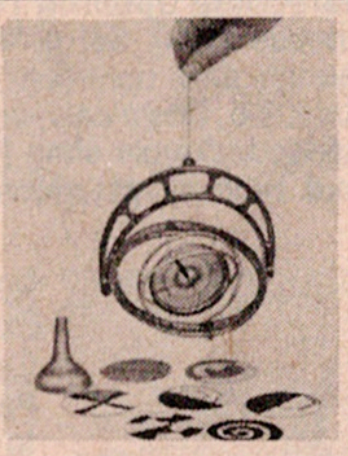
Flies in any direction, hovers, and then slowly descends for a soft landing. Control every movement with energy button and powerpack handle. Safe plastic propeller mounted horizontally under fuselage. High-impact plastic; 9" dia. Astronaut seated at controls under clear plastic canopy. Already assembled. Requires 2 "D" size batteries (not incl.). **No. 70,910 $4.20 Ppd.**

Car of the Future Here Now

One of the most impressive science toys we've seen. Rides a fraction of an inch over any surface, even water. Shows low frictionless motion principles of Ford's and Curtiss-Wright's aircars. Sturdy plastic, 8 x 9 x 2" high; 4" propeller; 48" control line; battery case. Uses 2 "D" batteries (not incl.).
No. 70,307 $4.00 Ppd.

Educational Gyroscope Set

A quality gyroscope that can do all kinds of tricks. Circular discs fit on gyroscope and create optical illusions, stroboscopic effects, etc. Complete set includes: balanced gyroscope rotor, frame (inner gimbal), handle, stand, strings, 8 optical illusion discs, and instr. booklet.
No. 71,136 $3.15 Ppd.



Low Friction Air Puck

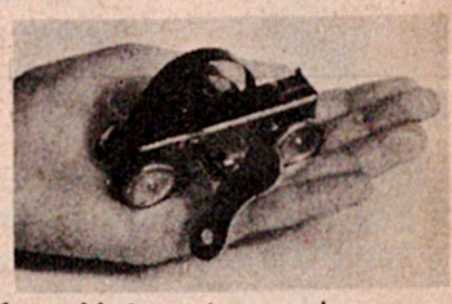
Demonstrates Ford's airglide principle by floating over any flat surface on a cushion of air. Powered by a special balloon; strong plastic 5" dia. base. Extra balloon incl.
No. 50,228 $2.60 Ppd.
5 Extra Balloons No. 40,341 $1.00 Ppd.

Deluxe Gyroscope Top Defies Gravity

Spins & balances at fantastic angles . . . on tips of pencils, hanging from a loose string, on your finger . . . even on the edge of a glass. Minute precision is the secret. The "fluid sand" weighted rotor spins on tiny microbearings so small that a thimble holds over 400 of them. Spins at the unbelievable speed of 10,000 rpm. Quiet, smooth, shock-resistant. Of super-impact plastic. **No. 60,052 $1.95 Ppd.**

Low-Cost Gyroscope similar to above. Includes booklet on gyro experiments. **No. 60,232 95¢ Ppd.**

Have Fun With Wind-Up Toys!

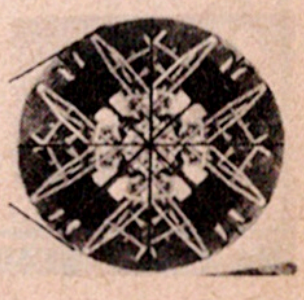


Nostalgia from the past, these tiny cars, with powerful clockwork motors, dash and dart all over the place. Streak along for races, experiments, or just plain fun. Motor stops when car overturns or hits something (re-starts when re-aimed). Metal wheels and chasis; unbreakable steel springs; 8 cog-wheel gears; running time. 3½ min. Overall size: 1 x 2 x 2¾". Pkg. of 2 motor cars and keys.
No. P-41,507 $3.00 Ppd.

A Complete Miniature Printing Press!

Print classroom newspapers, Boy Scout programs, Little League rosters, church bulletins, even neighborhood announcements. Did you know that backward type prints forward images? You'll learn all about printing & have a lot of fun too! Big press with automatic ink & pressure adjustments. Quality made with 30% greater printing capacity than less expensive "toys" commonly available. Prints a page 3½ x 7". Incl.: all metal press; 400 pieces of rubber type; 15 type slots; tweezers; picture dies, adhesive & mounting equipment; ink & brush; paper; & instr. **No. 71,864 $18.50 Ppd.**

Kaleidoscope World



Picks up surroundings and turns them into beautiful kaleidoscope patterns. Produces flashing array on moving objects. 9x2" ppbrd. tube.
No. 50,349 $4.00 Ppd.

Scientist's Work Kite . . . Amazing Parafoil With Wind Sock

A great new soft kite with no rigid parts . . . it's held in shape by the wind! Easy to fly! Wind inflates parafoil to an airfoil configuration (like an airplane wing), which provides maximum lift with minimum drag—the ultimate in aerodynamic efficiency. Hoists instruments, cameras, flags, etc. (up to 4 lb. at 15 knots). Scientists use parafoil principle for recovery of space vehicles, directionally-controlled cargo chutes, and in meteorology. On a windy day, simply toss it into the air and it's airborne! The small drogue (windsock) acts as a stabilizer or tail in stronger winds. Big 28 x 36" in flight, made of no-rip parachute nylon (virtually indestructable). Multi-colored 500 ft. of nylon line and instr. incl. **No. 60,974 $20.75 Ppd.**

Go Fly A Deluxe Kite

• It's Easy • Realistic

The Space-Bird Kite climbs, zooms, and glides with fluttering wings in bird-like fashion. Use for aerial photography, to pull you along on ice or roller skates. Even tows small boats! Launches without running. No tail needed. Space Bird is not a cheap flimsy kite; it's made of tearproof acetate cloth (red, yellow, blue) that's so durable you can fly it all year. 47" wing span & 33" length. 250 ft. heavy cord & instr. **No. 70,901 $4.98 Ppd.**

LARGER DELUXE SPACE BIRD. As above, but almost a 66" wing span and 47" length. 500 ft. of 20 lb.-test cord, reel, and instr. incl. **No. 80,101 $7.95 Ppd.**

High Flying Puffer Kite . . . Kite Flying Is A "Breeze"!

No running, no waiting for the ideal gust . . . just hold the inflated Puffer Kite above your head and let out the line. Made of strong, colorful vinyl, the Puffer Kite easily and quickly catches air currents! Inflation tube, tail loop, patching material, rayon cord, and instr. incl. 30 x 41 x 11" thk. when inflated. It's fun!

No. 41,279 $2.25 Ppd.

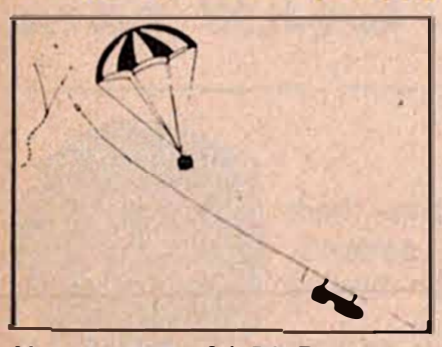
Giant-size (60 x 54 x 18"). **No. 60,961 $7.25 Ppd.**

"25 Kites That Fly" by Leslie Hunt

• Box kite with wings • Butterfly kite • Balloon kite
• Tetrahedral kite • Military kite • Windmill kite

Easy-to-follow details for construction of 25 different kites. Require only light wood, glue, wire, hammer & nails. Flight principles; kite photography also incl. Pprbk.; 110 pp.; 5-3/8 x 8½"; illus. **No. 9451 $1.25 Ppd.**

Launch Parachutes From Kites

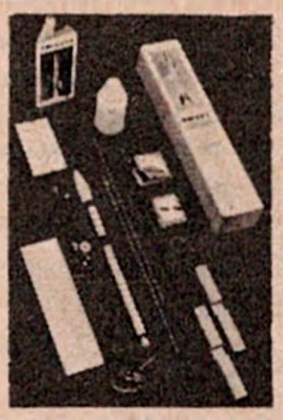


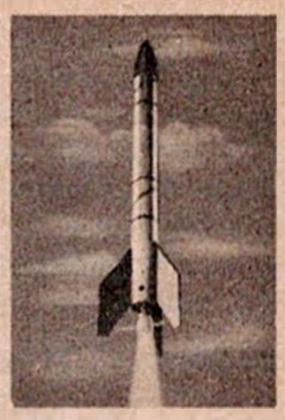
Great fun! Sky Liner travels up your kite line, automatically releases the parachute, and slides down line, ready for re-use, as the 18" dia. red and white parachute floats gracefully down to Earth. You get launcher, 3 parachutes, 3 "space capsules", instr.

No. 41,682 $1.50 Ppd.

Liquid Propellant-Driven Rocket Kit

Goes 1,000 Feet High!

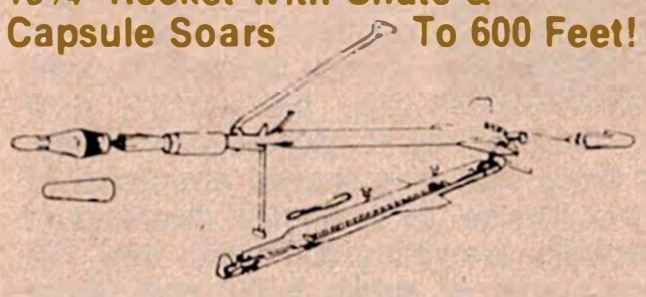


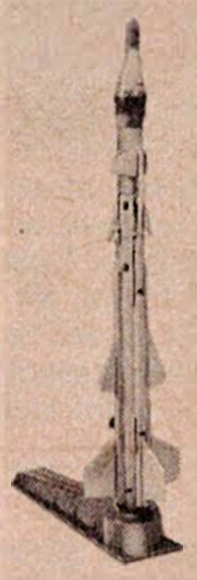


Build & launch an exciting Apollo-type rocket. Safe liquid propellant (non - flammable, non-toxic, heat-free) gives fantastically realistic lift-off & flight. Durable polished alum. rocket speeds nearly 300 ft. per sec. Returns on parachute of Echo Satellite material. Launch again & again! Rocket engine, timer, separator, parachute & tube, loading valve & hose, electric firing assembly, launch stand, 15 oz. can of propellant (3 launches), and 16-pg. instr. booklet incl. Assembled rocket, 16 x 1" dia., can be fired manually or electrically (6v battery not incl.). **No. 71,182 $16.95 Ppd.**

Two 15 oz. cans propellant No. P-71,192 $4.00 Ppd.

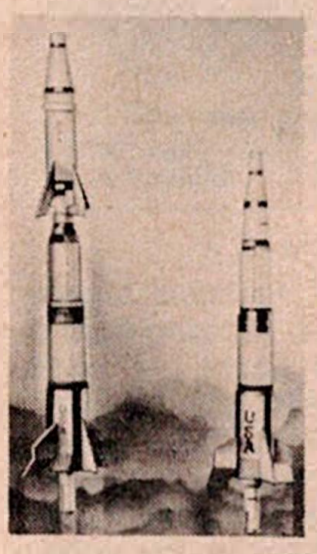
13¼" Rocket With Chute & Capsule Soars To 600 Feet!





Soars to fabulous height, then rocket and capsule disengage and float to earth, on parachutes. Launch again, but delay the parachute opening (11 time delays to choose from). Set controls for a slanting launch and continue your experiments. Safe, no chemicals or explosives. Two-handed, double sling (rubber) launches rocket from its pad. High impact plastic; made in Italy.

No. 70,845 $3.50 Ppd.



Apollo Staging Rockets With Extra Anti-Missile Rocket

Simple to operate, 2-stage rocket! Partly fill with water & use air pump to fill balance of space. Press release and 1st-stage goes up 200 ft.; then 2nd stage rocket blasts off to climb another 100 ft. Great fun! Made of Butyrate plastic & extremely durable. 1st and 2nd-stage rocket, 6" anti-missile rocket, fuel funnel & piston stem, and air injection pump incl.

No. 70,157 $3.75 Ppd.

XS-1 Space Vehicle

Precision-molded styrofoam plane flies like a dream! Does spectacular acrobatic stunts. Rocket engine, safe liquid fuel for 10 flights & instr. 12½" long. **No. 71,398 $5.95 Ppd.**

3-Ft. Balloons For Fun & Parties

3 brightly-colored balloons of heavy-duty rubber. Inflate to a whopping 3-ft. dia. Kids love to play with balloons . . . the bigger the balloons, the greater the fun. These giants are perfect for party decorations and favors, pool use, play balls, and for games. Set of 3 first quality balloons.

No. P-71,184 $2.95 Ppd.

BALLOONS! BALLOONS!

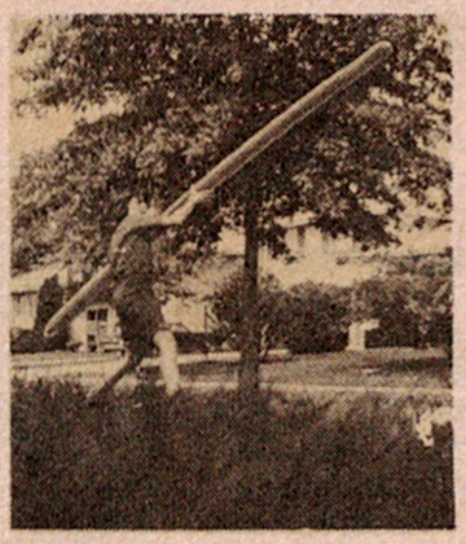
GIANT WEATHER BALLOONS

Huge 8 ft. and 25 ft. surplus Weather Balloons that really create a neighborhood sensation. Excellent traffic stoppers. Attract crowds for special sales, grand openings, fairs, and other special events. Our customers use them for the darndest things . . . swimming pool cover "holder uppers"; paper mache art; dance decorations; Christmas pinatas; launching radio controlled airplanes; scuba diving markers; distress signals; aerial photography, and more.

Originally for use in meteorological studies, these are made of thin neoprene rubber designed to burst at high altitudes. They are fragile; but with a little care when inflating and avoidance of sharp objects, they are perfect for weather experiments. (Note! less than full inflation makes them more durable.) Not to be confused with bag-like balloons of rubberized fabrics which sell for $250.00 or more. Inflate with vacuum cleaner, air pump, or helium (for aerial use). Inflation instr.

8-Ft. size. No. 60,568 $2.50 Ppd. 25-Ft. size. No. 60,632 $13.95 Ppd.
3 or more 8-Ft. Balloons . . . only $2.25 each!

Amazing Super Balloon . . . Sails Over 100 Feet!



A giant 10-ft. long balloon . . . play catch with friends, throw for distance or targets, balance on your nose, invent games! Great fun for everyone. Easy to inflate. Made of heavy-duty polyethylene. Repair patches and instr. incl. Giant balloon draws a crowd anywhere!
*Price includes postage and handling.

No. 41,758 $1.45 Ppd.*

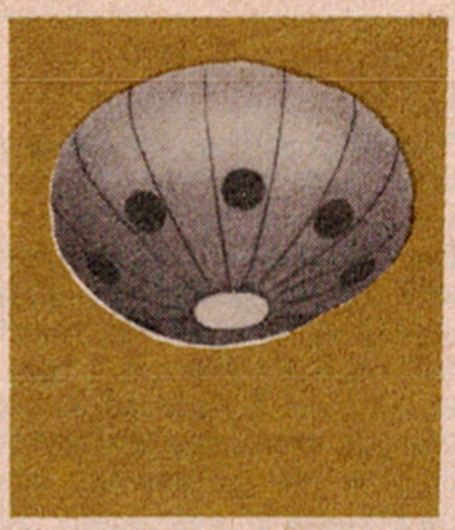
More Balloon Fun With 3-Ft. Weather Balloons

Great fun in the backyard or in the pool . . . even fun for contests at school.

3-Ft. Balloons. Pkg. of 2.
No. P-41,755 $3.50 Ppd.

Giant 9 Ft. Hot-Air Flying Saucer Kit

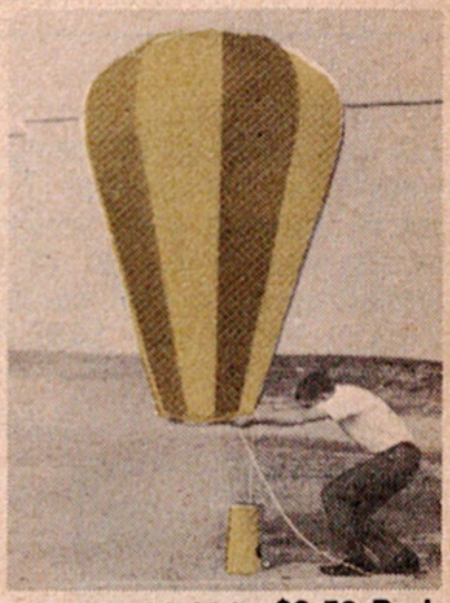
Fun! Fun! Fun!



Rises to amazing height on just hot air. Provides lots of inexpensive fun. Easy to assemble and launch. Ideal for the 4th of July, science clubs, picnics or just plain outdoor fun. Attach a string tether and you can loft object up to ½ lb. Saucer can be used over and over again. If damage occurs, you can easily repair it. Kit includes 16 pre-cut gores of grade #1 white model paper, 8 red panels for portholes, wire, cord, and instructions. Make and fly your own U.F.O.

No. 71,175 $3.50 Ppd.

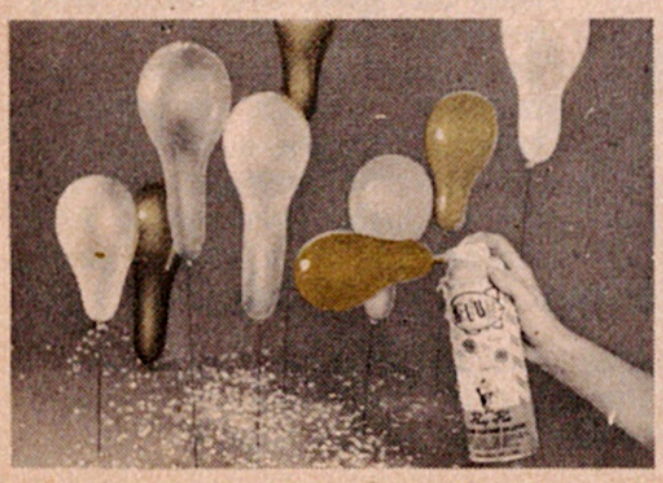
Large 9-Ft. Hot-Air Balloon Kit



Have lots of inexpensive fun with these large, colorful hot-air balloons. When fully inflated (approx. 5-ft. in dia.), they rise to about 200 ft. on just hot air. With string tether attached, you can loft model airplanes, etc., up to ½ lb. Ideal for the 4th of July, science clubs, etc. Balloons can be used over & over (easily repaired if needed). Kit incl.: 10 pre-cut, red & white gores (No. 1 model paper); 6 ft. of 14 ga. wire for bottom ring; cord; instr.

No. 60,691 $2.50 Ppd.
2 6-ft. kits . . . smaller size is easier to inflate.
No. P-71,866 $3.75 Ppd.

Two Cans of Helium and 20 BALLOONS



Few things delight a child more than a helium-filled balloon . . . the way it tags along way up above his head where everybody can see . . . the way it gently tugs at the string as if entreating its little master to set it free . . . and the way it adventurously climbs out of sight when it finally gets its way. Now you don't have to wait until "carnival time" to treat your child to this pleasure. Get this Helium Balloon Kit. Includes 20 colorful balloons (4, 5, and 6"—dia. when inflated); and 2 pressurized cans each containing .21 cu. ft. of helium (enough to inflate 16-20 balloons). Ideal for both adult and kids' parties . . . or demonstrate in class what "lighter than air" means . . . or just enjoy flying them. (Note: Helium is a safe, nontoxic, inert gas. Container has sealant so we do not recommend for internal use.) "They're a gas!"

No. 71,289 $3.00 Ppd.

Visualize In 3 Dimensions With "Think Sticks"

The ideal visualizing and demonstration tool for teachers; learning aid for students in math, physics, design, and architecture. Good for Science Fair projects.

In mathematics, Think Sticks are used to construct geometric figures ranging from triangles to such many-sided figures as icosahedrons. In design classes, models are made to determine functional efficiency. Architectural and engineering instructors mock up girders, trusses, towers, etc., and show the nature and effect of stress.

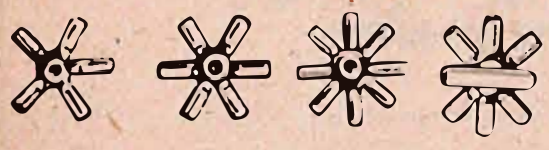
Professional uses aside, Think Sticks open new horizons of fun, knowledge and experimentation for any youngster. Ease of use and durability make Think Sticks much superior to old-fashioned wood or metal kits. 1/8" dia. plastic or birch sticks fit smoothly into 1" polyethylene joints having 1/8" sleeves—form rigid structures. (Connectors can be bought separately. T-connector supplied only with Kit No. 70,211.) Complete instr. incl.

Kit No. 70,209 Introductory Set. 220 pieces . . . 5, 6, & 8-sleeve connectors: 2, 3, 4, 5, 6 & 8" colored Think Sticks. **$4.75 Ppd.**

Kit No. 70,210. For advanced interests. 370 pieces . . . 5, 6, & 8-sleeve connectors; 2, 3, 4, 5, 6, 8, 10 & 12" colored sticks. **$7.00 Ppd.**

Kit No. 70,211. Fills the needs of schools, architects, etc. 452 pieces . . . 5, 6, & 8-sleeve connectors; T-connectors (allow stick to pass through); 2, 3, 4, 5, 6, 8, 10 & 12" colored Think-Sticks; long length of unpainted sticks which can be cut to fit need. **$10.00 Ppd.**

Separate Connectors. Unpainted Sticks.



(A) (B) (C) (D)

Type	Pkg. Of	No.	Price Ppd.
(A) 5-sleeve	50	**P-60,108**	**$3.50**
(B) 6-sleeve	50	**P-60,109**	**3.50**
(C) 8-sleeve	50	**P-60,110**	**3.50**
(D) T-conn.	50	**P-60,111**	**3.50**
24" Sticks	100	**P-60,112**	**2.00**

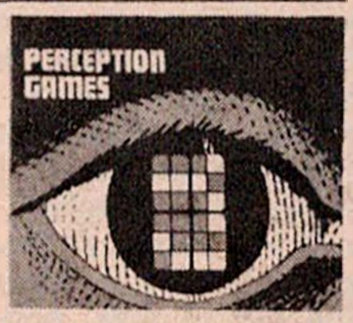
Edmund Popular Science Fun Chest . . .

A $9.00+ Value

Hours of Fun and Learning!

You get: 1) **A Drinking Bird** that bobs continuously (by thermal energy) with a glass of water in front of him. 2) 5-piece **Moire Color Set.** 3) Amazing **Sealed Puzzle** with real mercury inside. 4) **Diffraction Grating Rainbow Viewer.** Mounted transmission and reflection-type gratings, each with 13,400 grooves per inch. 5) Motion saving Edmund-Tak **Pik-Up Ring.** 6) 5 flat **Ceramic Magnets.** 7) **Burning Lens.** 8) **Magnetic Doggie,** ball spins as he approaches it. 9) **Static Electricity Generator.** Safe, fun with friends. 10) **Roy G Biv Membership Card** with colors of spectrum. 11) Edmund's popular **"Astronomy and You"** Booklet. Instr. incl. **No. 70,787 $5.95 Ppd.**

15 Perception Games

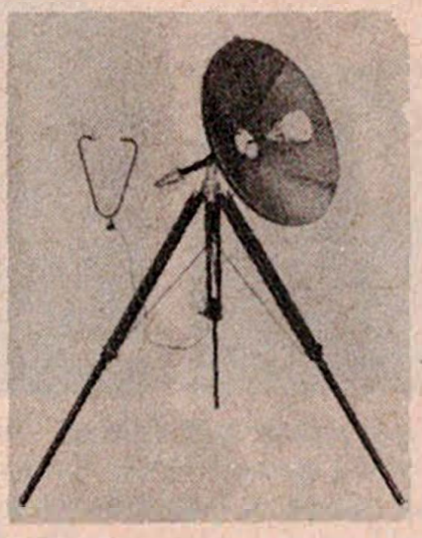


How good are you at seeing the overall view of things? These games improve your ability by making you think. Incl. 36 Perception cards, 6 ESP cards, 40 chips. **No. 71,162 $4.95 Ppd.**

Amaze Your Friends With Magic—It's Fun

Imagine your parents and friends in a room—then you, Magnifico The Great, walk out & fascinate them with mystifying magic tricks that bring "oohs" & "ahs" of amazement. Make eggs appear and disappear, puffs of smoke shoot from your fingertips, make things vanish, change nickels into pennies, and more.

This Magic Chest contains all the special equipment you need—egg vase, coin changer, Chinese genie bottle, magic balancing wand, always-full water jug, Chinese linking rings, mystic smoke maker, a phoney mustache, sure shot dice cup, card locator, cigarette through handkerchief, money maker, and booklet of 102 amazing tricks that you can perform using these materials and others found around the house. Kit is supplied in brown magic chest with handle so you can take your tricks on tour. Is the hand quicker than the eye?—You bet it is! **No. 71,173 $12.00 Ppd.**



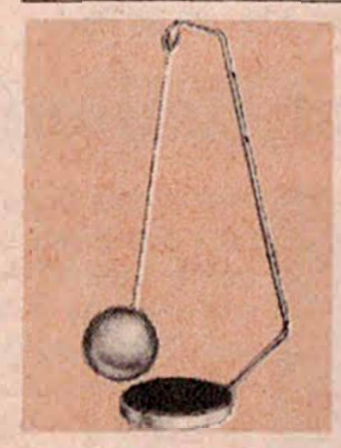
"The Big Ear"®, . .

The Electronic Sound Collector

A space age electronic spy toy that "homes in" on a whisper at 20ft., normal conversations at up to 100 ft., bird calls and high frequency sounds at almost 200 ft. (works almost twice as far over water)! Use indoors or out—from baby sitting to bird watching . . . everyone will enjoy it. Sets up in seconds; easy to operate, the big 18" plastic reflector disc concentrates sound waves into transistor unit, then amplifies them. Incl. microphone system, stethoscope ear phones, adjustable tripod (33½" extended); instr. **No. 80,176 $26.50 Ppd.**

Thirsty Bird Drinks & Drinks & Drinks

Place him in front of a cup of water, wet his beak, & watch him go . . . he bob's up & down to drink and keeps going back for hours until the water supply is beyond his reach. Actually this drinker is a heat engine. Water evaporation on his beak & head cools his insides, causing pressure changes on visible liquid that raises his center of gravity. This makes him bob down into the water starting the process all over again. Stands approx. 8" high. Instr. incl. This imported bobbing bird contains a safe, non-inflammable liquid. **No. 60,778 $1.50 Ppd.**
Pkg. of 12 **No. P-71,596 $11.95 Ppd.**



Magnetic Hyper-Ball

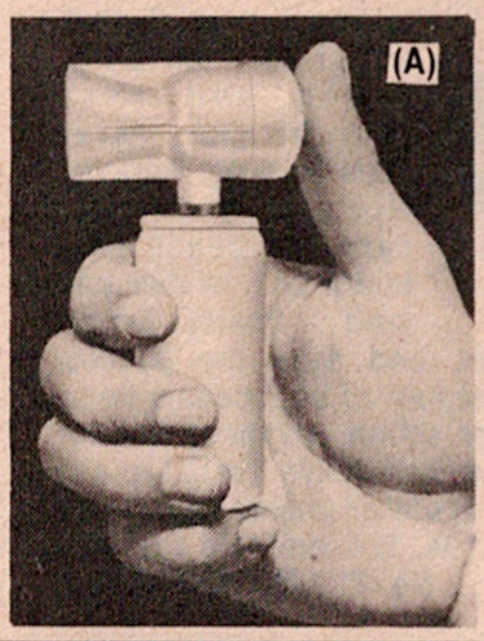
Suspended by a fine, strong nylon thread over a magnetic base, this Hyper-Ball goes thru some fancy gyrations. Sometimes it seems "undecided" where it wants to be, just plain "nervous," or positively "hyper!" Just give a little push & witness some dramatic, dynamic effects caused by magnetic field interactions on a kinetic body. **No. 71,336 $10.25 Ppd.** Metal; 8½" high.

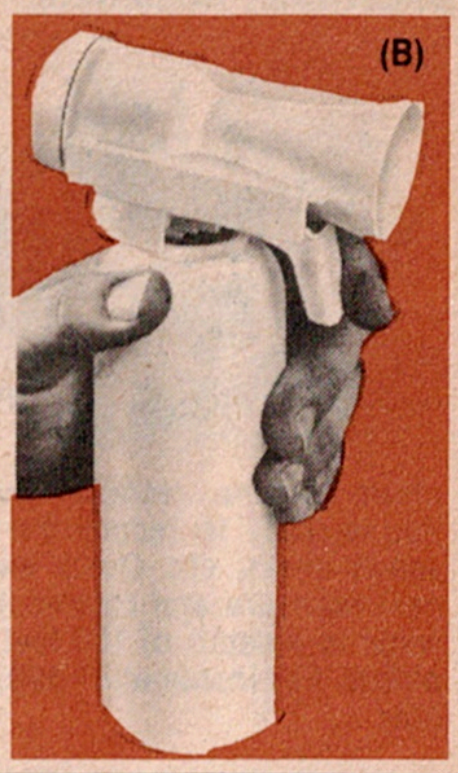
Fantastic New Magic Set. see page 14.
Terrific New Aeronautics Kit. see page 2.
Fascinating New Electronics Kit. see page 90.

loud! Loud! LOUD! Power Horns

Can Be Heard Up To ONE MILE Away!

Perfect for safety, signaling and fun! Take one along: for boating, beach and shore (it floats); as a ship to shore signal; to root for your team; on camping, hunting and hiking trips; as a portable emergency horn; for fire drills; to frighten prowlers, mashers and vicious dogs; as a warning for deaf mutes; etc. These Freon-powered horns can easily be heard over traffic and construction noises. Just press top (or squeeze trigger on large version) and over 118 d.b. blast loose.





(A) Miniature Power Horn. Pocket size (4-3/4 x 2-3/8 x 1-1/4") . . . wt. 3 oz. Contains up to 100 blasts.

No. 41,423 $3.25 Ppd.

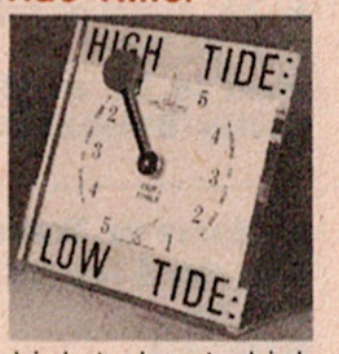
(2) 2.1 oz. Refills No. P-41,424 $3.00 Ppd.

(B) Big Blast Air Horn. Lasts almost 6 times longer than above. Up to 300 blasts. Wt. 12 oz. Slide lock.

No. 71,630 $8.25 Ppd.

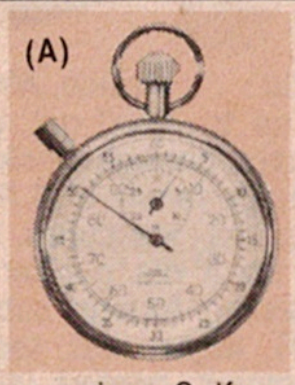
12 oz. Refill No. 60,928 $2.50 Ppd.

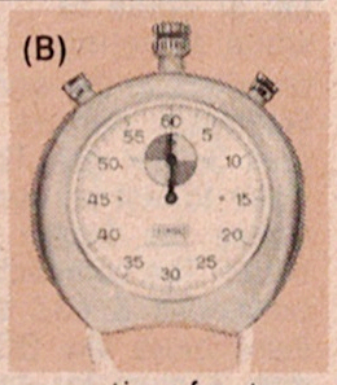
Fisherman's Delight—Electric Tide Timer



Fishermen! Boat owners! Seashore home owners! Vacationers! This attractive Electric Tide Timer ends fancy figuring of tides from time clocks. Stops use of newspaper tables. Has a precision, transistor-controlled, jeweled clock movement set specifically to indicate high and low tide periods, as well as a countdown in hours from high-to-low-to-high tides. Clear acrylic face 6 x 6 x ½" with table and wall mounting brackets. 1-yr. mfg. guar. Runs on 1 "C" battery (not incl.). High and low tides occur twice daily . . . due to tidal nature, timer only effective on Atlantic coast of U. S. and Canada. **No. 71,779 $31.00 Ppd.**

(A) Multi-Use Stopwatch





For sports, school, military, lab, industry; decimal timer; recommended for study. Reset button locks; can't reset while running. Self-compensating for temperature changes, 7-jewel movement, unbreakable mainspring. Dial registers in 1/5th seconds; 60-sec. sweep. Small hand registers up to 30 min. Dial divided into 1/100ths of a minute for time study work. Start, stop, continue from any reading by pushing crown. Side reset button. Chrome-plated case.

No. 30,371 $36.50 Ppd.

Similar to above. Dial reads in 1/10 seconds; 30-second sweep. Small hand registers up to 15 minutes. Dial has black numerals for 1-30 sec; red for 31-60 sec. No decimal timer. **No. 40,472 $36.50 Ppd.**

Quality Stopwatch. Similar to No. 40,472 above but only 1 jewel. Has side reset button without locking feature. **No. 40,817 $30.25 Ppd.**

(B) Stopwatch With Neck Cord

Great for sports! Coaches laud its many features: neck cord assures it is "always there"; 60-min. register with color-coded segments for specific sports (basketball, jr. hockey, football); 60-sec. dial in 1/5 graduations; 3 controls (start, stop, return to zero) for quick, easy timing. Hangs upside down for easy reading. 2½" dia. high impact plastic case; shatterproof crystal. Shock-resistant, antimagnetic mechanism with unbreakable mainspring; Swiss quality workmanship. Instr. incl.

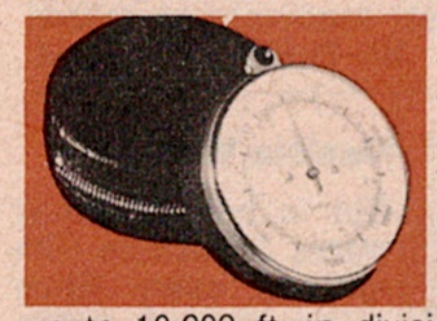
No. 41,359 $28.50 Ppd.

Space® Age Blankets

Strong, lightweight, superinsulated material. Spacecraft proven. They return 80% of your body-heat. No equal for warmth and protection from sun and foul weather or as a suntanning aid. Perfect for sportsmen, travellers, etc. Just the thing for the car, beach, picnic, stadium games, etc. Wind and waterproof. Won't crack, mildew or rot. 56 x 84". Wt. 12 oz.; reusable plastic pouch. **No. 70,886 $8.25 Ppd.**

Space® Rescue Blanket (Disposable). As above, but single layer of metalized polyvinylchloride. Flexible at 60° below zero; reflects 80% body heat (excellent light reflector for photographers). Wt. 2-oz. in poly bag. Folds to pocket size. **No. 60,636 $2.10 Ppd.**

Pocket Altimeter Measures Your Elevation



Perfect for hikers, campers, vacationers, and outdoor enthusiasts. This German-made precision instrument is actually an aneroid barometer, graduated in feet of altitude, as well as inches of mercury. Registers any given elevation up to 12,000 ft. in divisions of 100 ft. Also used for weather forecasting by reading the inner inch dial. Can be adjusted to reflect changes in pressure other than those related to elevation differences. Heavy duty plastic, glass face, chrome plated adjusting ring and hanger. Leather case; 2¼" dia. **No. 41,915 $39.75 Ppd.**

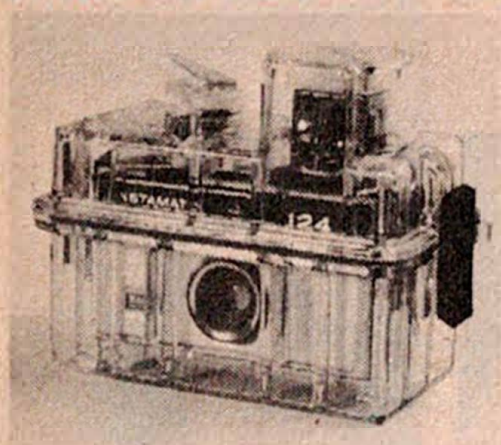
How Far Did You Walk Today?

Walking is said to be the wise man's sport and has been heralded by doctors as the safest, most effective form of regular exercise. Now you can measure the distance you walk, precisely to the tenth of a mile, with this digital pedometer. 3-digit display easily registers up to 99.9 miles. Pedometer adjusts for your stride in ⅓-ft. intervals from ⅓-ft. Great for hikers, campers, joggers, and even time study tests. Compact black plastic case weighs only 1¾ oz. Comes with auto. reset button. belt-clip, loop chain and ring. 1¾" square. **No. 41,914 $12.75 Ppd.**

Try An Unusual Sport!

Treasure Hunting & Coin-Shooting . . . have fun & maybe find something valuable, see detectors on pages 40 & 41. Become a Rock Hound and start a valuable rock collection, see tumblers and accessories on pages 37-39.

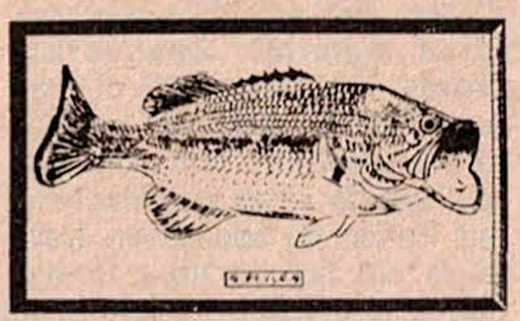
Underwater Instamatic® Camera Case



Forget water, snow, sand, dust, or rain. Extend your picture taking fun to diving, boating, surfing, skiing, and those rainy-day shots you've been missing. Rugged, air and water-tight case fits beach bag, tackle box, or dive bag (and it floats). Simply insert camera, replace cover, and snap the latches. You're ready to record the beauty of an ocean's floor, snowy peaks, etc. Quick lever action advances film for next exposure and rotates the flash cube. Tested in sea water to a depth of 100 feet. Made of unbreakable clear plastic. For Instamatic® 100, 104, 124, and 134 cameras only. **No. 71,549 $23.25 Ppd.**

Taxidermy Kits . . . Quick, Easy

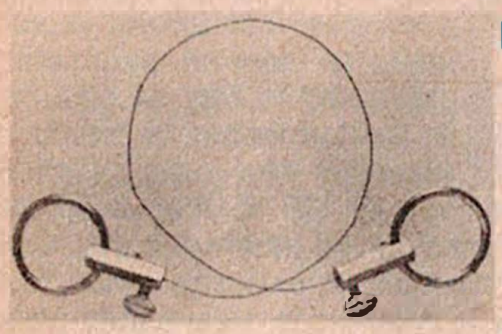
- **Fish** • **Bird**
- **Small Animal**



Safe: Non-toxic materials. **Complete:** all tools, materials, and instructions for a professional job. **Easy:** no experience necessary to mount a fish in 2-3 hrs. or a bird or animal in a few hrs. Friends admire your finished specimens . . . cabinet mounts can be used by schools, scouts, etc. to teach bird & animal identification.

Large Fish Mounting Kit. Sufficient material to mount two 5 lb. fish. Skinning knife, scraper, preservative (non-poisonous), Fish Mix®, needle & thread, eyes, paint, varnish, brush, etc. **No. 71,690 $11.50 Ppd.**

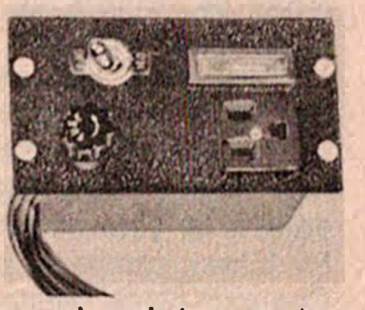
Bird & Small Animal Mounting Kit. Tools, stuffing materials, etc. to mount 4 complete specimens or several cabinet mounts. **No. 71,691 $11.50 Ppd.**



Flexible Wire Saw

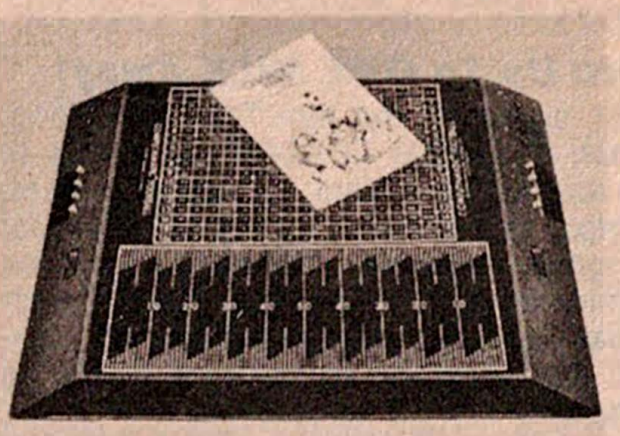
Cut in hard-to-get-at places impossible with full-size saws. Slice quickly through metals plastics, wood, etc.; rolls into a handy little ball. Ideal for campers, hunters, scuba divers, scouts, general household or carpentry activities...for repair kits, survival kits, etc. 15" steel alloy blade; removable end lugs; resists rust. Wt. 4-oz. **No. 60,975 $3.75 Ppd.**

Instant 110v Electricity . . . From Your Car



Truck, tractor, boat or any other engine using an alternator. You no longer have to depend on power lines. In the backwoods, just start your engine & you can still operate electric lights, coffee makers, broilers, electric stoves, even hand tools such as drills, power saws & any item using a **brush-type** motor. Also charges batteries in 3-5 min. Safe to use, won't damage alternator, voltage regulator or wiring. Easily mounts on dash or under hood (with 2 screws). Not recommended for Motorola alternators, DC generators or integral regulator alternators. Will not operate T.V.'s, air conditioners, furnaces or appliances with brushless motors. Hardware, connectors & complete instr. incl. 4½ x 2½ x 2¾". Wt. 12 oz. **No. 42,008 $15.95 Ppd.**

Computamatic Football/Basketball



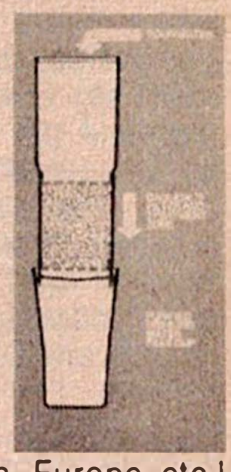
The Ultimate Sports Game For Adults And Teenagers

Attention armchair quarterbacks! Now you can use all that "pro" strategy you've been saving all these years with Computamatic Football. Select the right play-pass, run, kick, etc. and let the opposition try to second guess and block your attempt. The computed results are instantly flashed on the Computamatic board. Tired of football? Flip the plexiglass "field" over and it instantly becomes a basketball court—letting you shoot, rebound, and score like the pros. Programmed for realistic plays and results, this electronic game is durably constructed of mahogany finished plastic and runs on 4-"AA" batteries (incl.). Large 23 x 18 x 2" playing surface. Wt. 7 lb. **No. 80,193 $34.95 Ppd.**

Want to be a 4-letter man? See overlay below.
Hockey/Baseball Overlay No. 80,194 $10.00 Ppd.

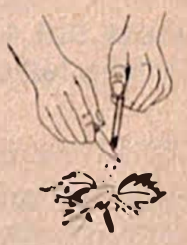
At Home or Traveling . . .

Safe, Good Tasting Water Anywhere With the Waterpack Water Purifier

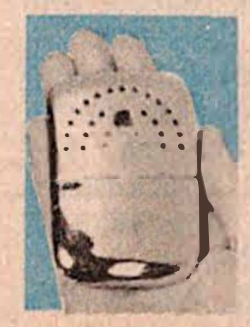


Sweet, clear, delicious spring-like water from your tap at home or while traveling anywhere in the world . . . Mexico, Africa, Europe, etc.! Waterpack purifies up to 1,500 gal. of water for less than 3¢ per gal. That's enough drinking and cooking water to last an average family of 4 for about 2 years! Coffee, tea, frozen juices, ice cubes, etc. will all taste better! The compact 9 x 3" dia. purifier removes harmful poisonous & bad tasting foreign substances such as insecticides like DDT, algae, rust, sediment and chlorine. A must for campers, boaters (not for salt water) and hunters (no more bottled water to lug around)! Water filters through oligodynamic silver and activated carbon—a combination that kills disease carrying bacteria from questionable water such as streams, rain water, boat storage tanks, even where local tap water is an unknown factor. Just pour water in top and make a quart of good purified water every min.! Don't confuse with ordinary charcoal-filters that fail to kill bacteria and become a breeding ground for bacteria, thus contaminating rather than purifying water. Tumbler, travel case and instr. also incl. **No. 71,867 $39.95 Ppd.**

3000 Lights From 1 Match?



Amazing Metal Match lights any fire you can start with a regular match (even when wet)! Won't self-ignite! 2½ x 3/16" dia. Instr. **No. 41,056 $2.77 Ppd.**

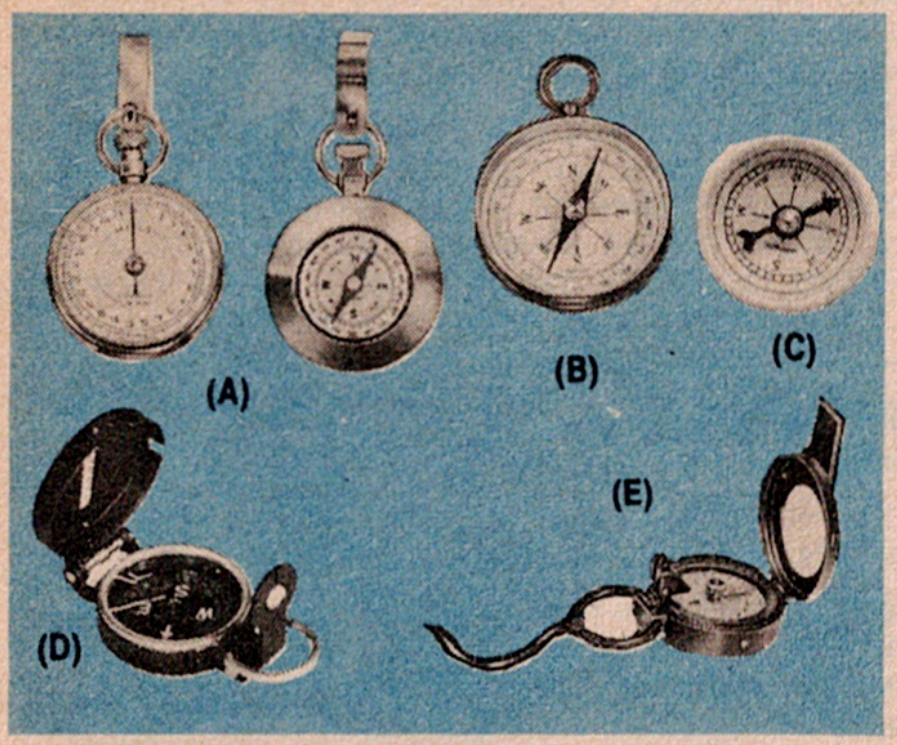


Pocket Size Hand Warmer

Hunters, campers—unit fits hand, warms without a flame. Gives off heat for 24 hrs. on 1 filling. Nickel-plated case 3¾ x 2-5/8 x ½"; hole for lighting cigarettes. Wt. 2½ oz. Incl. velveteen bag & instr.
No. 40,610 $2.05 Ppd.

TRAVEL AIDS

COMPASSES



(A) Combination Pedometer And Compass

Learn how many, many miles you walk or jog each day. 1-5/8" dia. pedometer easily adjusted to length of stride. 25-mile register calibrated in ¼-mile divisions. Magnetic compass on other side. Chrome-plated case w/belt-clip and chain ring. **No. 41,000 $12.95 Ppd.**

Inexpensive Magnetic Compasses

(B) 45mm dia. Highly polished brass case with beveled glass top. **No. 40,470 $75¢ Ppd.**

(C) Great for kids party prizes. 16mm dia. Pkg. of 6. **No. 40,468 $1.30 Ppd.**

(D) Pocket Lensatic Compass

Look through magnifying lens to find direction you're heading. Hairline guide for sighting on distant objects while reading position in degrees or mils. Luminous 4 points of compass and reference marks on revolving dial for night use. Folds compactly . . . Dial 1½" dia. **No. 30,235 $4.95 Ppd.**

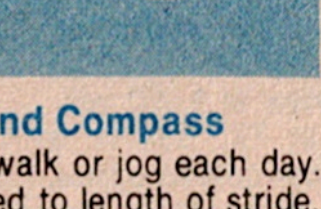
(E) German Prismatic Compass

Ideal for surveying above and below ground, or use as a hiking compass. Brass case with sighting mark in clear lid and 35" neck cord. Hinged prism mount with prism for magnified reading. Rotating metal dial and index pointer for quick adjustment. Liquid filled; jewel bearing; luminous markings. 5/8 x 1-7/8" dia. overall. Leather case, instr. incl. **No. 1929 $29.00 Ppd.**

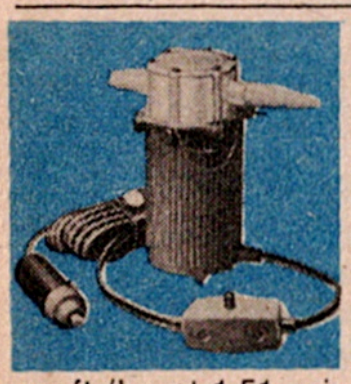
"Be Expert With Map And Compass" By Kjellstrom

Easy & fun to read. Great for scouts, hunters, etc. Illus.; step-by-step info.; practice compass & protractor; 136pp; 5-3/8 x 7-7/8"; pprbk. **No. 9438 $3.50 Ppd.**

Measure Map Distances In Miles, KM



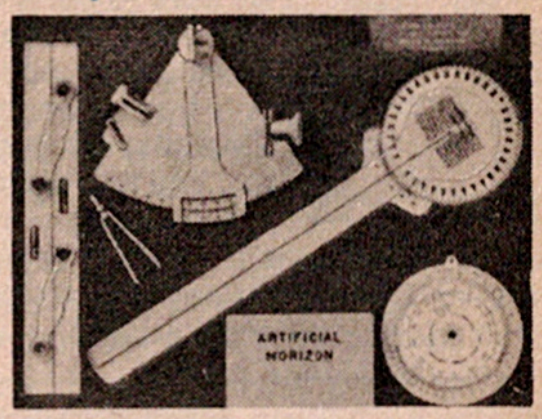
Roll along route on map. Tells distance in miles, naut. miles, kilometers, 1 mile to in., 1 naut. mile to in., 1 kilo to cent. Leather sheath. **No. 40,469 $3.90 Ppd.**



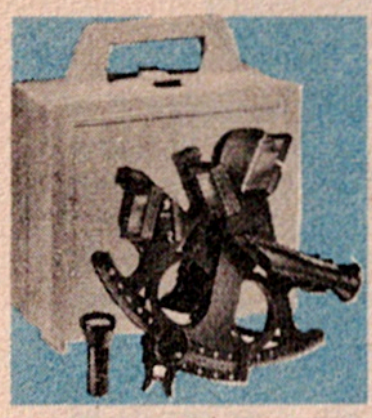
Don't Waste Your Breath; Use An Air Pump

Electric, hand-held pump quickly inflates air mattresses, beach balls, rafts, pools, balloons & other rubber or plastic inflatables. Regulated compression prevents overinflating. 110v AC, .5 amps; 4¼ x 2" dia.; wt. 14 oz. Pumps 29 cu. ft./hr. at 1.51 psi. Shatterproof Teflon & polystyrene. 2 nozzles, adapter, 10 ft. cord & instr. incl. **No. 60,776 $12.95 Ppd.**

Navigation Kit . . . Comprehensive Starter



Economical package of instruments most often used by navigators: **(1) Standard Marine Sextant** reads to 2 min. of arc. 9 x 8½ x 3"; 7" arc; instantly adjustable; 4 sunshades; corrosion proof, rugged plastic. **(2) Artificial Horizon:** for hikers, navigators, etc. Corrosion resistant, rugged plastic; 4 sunshades. Folded: 6 x 4 x 1½". **(3) 18" Three-Arm Protractor** for locating ship's position. Reads to 2 min. of arc. **(4) Parallel Rules** with handles & non-slip pads. Transparent w/clear optical finish to aid in charting. 15" long. **(5) Time-Speed-Distance Computer:** 6" dia. circular slide rule. Heavy-gauge, sturdy plastic. **(6) Metal Dividers. (7) Instr.** for ea. **No. 80,154 $41.50 Ppd. Standard Marine Sextant only. No. 71,421 $16.95 Ppd.**



Deluxe Marine Sextant

Take a ship anywhere! Independent 2-mirror adjustment; 7 sunshades; reads to 2 min. of arc; slow travel wheel; hooded sight tube; handle. Plastic; 10 x 10 x 4"; corrosion & impact resistant. Has 3X scope. Case & instr. incl. **No. 71,422 $61.00 Ppd.**

Unique, Chemical Emergency Light/Marker

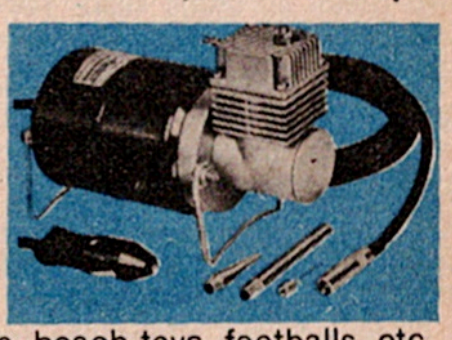
• Weatherproof • Handy • Reliable • Chemiluminescent • Durable

Emergency light sufficient to read by, dial a phone, find your way, work by, bring help! Good for motorists, campers, boaters. Simple to use: bend 6" wand to break inner glass tube; shake; light is immediate, lasts at least 3 hours (1st hr. comparable to flashlight; next 2 like night light). 2 liquids combine to produce bright yellow-green light (visible over 1,000 yds.) without heat, flame, or external power from -20° to 125° F; work underwater; won't corrode or ignite. Pkg. of 3. **No. P-60,923 $3.00 Ppd.**

Stop Fumbling For Keyholes

U.S.A.-made mini light attaches to key. Squeeze case to project bright beam to light keyholes, read maps & programs. Micromini lamp platinum wired, powered by self-regenerating, silver, energy cell. No batteries needed. Lifetime guarantee! Far superior to imports (which soon exhaust battery). Handsome case 1¼ x ½" thick. **No. 60,431 $3.25 Ppd.**

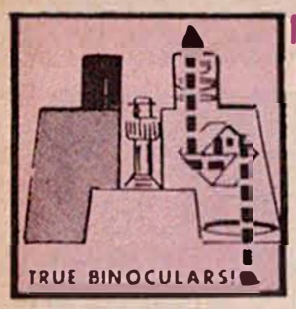
Mighty Mini-Compressor



Plugs Into Car Cigarette Lighter

A 12v DC air compressor to fit in small spaces and do big jobs. Carry your own supply of air wherever you go. Inflate tires, air mattresses, air jacks, boats, rafts, beach toys, footballs, etc. Small enough to hold in the palm of your hand. Safety valve set at 40 psi, maximum pressure 60 psi. Delivers 42 cu. ft./hr. at 0 psi and 18 at 30 psi. Comes with cigarette lighter plug, 3-ft. cord, 10-ft. air hose, valve and other accessories. Maintenance free; oil-less piston and sealed bearings with hard chrome cyclinder wall never require lubrication. Wt. 5 lb. 6½x4¾x4¾". **No. 1628 $31.25 Ppd.**

BINOCULARS



Facts About Binoculars

Be sure to get a true prism binocular . . . don't be fooled by field glasses (imitation binoculars). Edmund sells only true binoculars!

Binocular Markings . . . 6X30, 7X50, etc. The first figure refers to power, a magnification of 6X, 7X, etc. The second figure is the mm dia. of each objective lens.

Relative Light Efficiency (R.L.E.) is the brightness of the image you see through a binocular. The higher this figure is (37, 75, etc.) the brighter the image.

Optical Alignment. All binoculars we make and supply are correctly adjusted and calibrated before leaving here . . . so you're all ready to go!

How to Select your Binoculars. How will you use them? The 6X30 is popular for sports events. Compact and comparatively lightweight, it can easily be carried all day. 7X35's, a good all-around size for sports, bird watching, etc. 7X50's, though larger & heavier, have a R. L. E. of 75 & are great for low light situations.

Edmund's Famous American-Made 6 X 30 Binoculars . . . The last of their kind!

Big Savings!

- Priced 60-75% below other American ones!
- Coated Optics
- Individual Focus

We've already run out of parts for our American 7 X 50's . . . only 6 X 30's are left. Take advantage of these top-quality, low-priced binoculars that compare with $200 American makes . . . while they last! Field of view: 445 ft. @ 1,000 yd.; R.L.E. 37; 5mm exit pupil. Wt. 30 oz. Case & straps incl. **No. 963 $65.00 Ppd.**

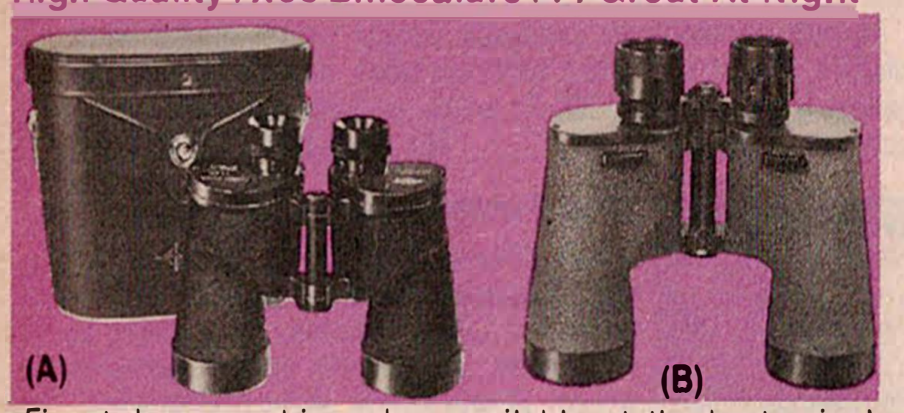
Accessories For American-Made Binoculars

Eyepiece Caps. Pkg. of 2. **Each Ppd.**
6x30's **No. P-21,002 $1.50** 7X50's **No. P-22,005 $1.40**

Polarizing Attachment. Reduce glare, see more clearly over water, from airplanes or viewing bright scenes. 6X30 **No. 40,532 $3.75 Ppd.** 7X50 **No. 20,000 $3.00 Ppd.**

Tripod Mount. Helps eliminate "hand held" vibrations that make field of view unsteady. Accepts binocular shafts up to 5/8" dia. and will fit any standard photographic tripod head 4-¾ x ¾ x 1". Black anodized aluminum. **No. 50,362 $3.75 Ppd.**

High Quality 7X50 Binoculars . . . Great At Night



Finest Japanese binoculars available at the best price! Larger than average exit pupils (7.14mm), high R.L.E. (84.2), 50mm objective lenses for razor-sharp images in minimal light. Lenses & prisms of Barium Crown Glass. Air-to-glass surfaces have hard amber coating to reduce reflections & glare to min. Ultraviolet inhibitor coating on objectives gives squint-free, sunsafe viewing. Slotted prisms prevent diffusion. Seamless monobloc bodies. Converbible eyecups & cases.

(A) All-Weather, Waterproof Binocular . . . exceeds gov't specs. Outstanding in unfavorable conditions. Individual focus. Field of view: 383 ft.; focuses to 21 ft. Ht. 7.3". Wt. 52.2 oz. **No. 1553 $199.00 Ppd.**

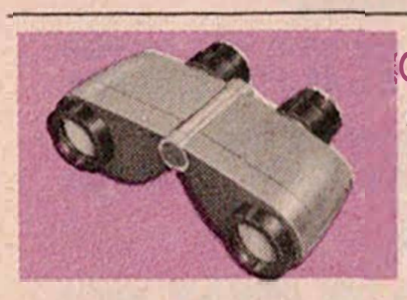
(B) Center-Focus Binocular (not waterproof) . . . ideal for sportsmen. Easily focuses in on sharp detail at dawn, dusk & in moonlight when ordinary instruments deliver a shadowy blur. Field of view: 376 ft.; focuses to 15 ft. Ht. 6.6". Wt. 38 oz. **No. 1554 $124.00 Ppd.**

"Peterson's Field Guide To The Birds" Covers eastern land & water birds. 1,000 illus. (500 color). 4½ x 7-1/8"; 230 pp; pprbk. **No. 9429 $3.95 Ppd.**

ZOOM

From 7X to 17X Instantly

Literally five different-power binoculars in one rugged, precision instrument with big 40mm objectives. Field of view at 1,000 yds. . . 288 ft. at 7X; 192 ft. at 17X. Amber coated optics. Popular, center-focus American type. Adjustable right eyepiece. Extra fast, extra smooth, fingertip control lets you change from power to power instantly. Wt. only 2.6 lb. Made in Japan. Carrying case, straps, and lens caps incl. **No. 1545 $79.50 Ppd.**



Orange 8 X 30 Binoculars

All-purpose fun binocular for rough & tumble use . . . in sun & rain! Individual thumb focus for sharp, clear picture. 8X with 30mm light gathering lens; field at 1000 yd.: 394 ft. Safety orange fiberglass body . . . stronger than steel yet weighs only 12 oz.! Ht. 4"; wth. 6½". Rolldown rubber eye-cups; shockproof lens shields; coated optics; neck strap & "mini" carrier. **No. 1552 $31.50 Ppd.**

Stedi-Eye . . . The 12X telescope that won't shake!

Amazing high-power telescope opens a new world of clear, long distance viewing . . . even when in motion. A built-in optical stabilizer compensates for hand tremor. Great for close-up viewing, even in motion on boats, buses, etc. Simply aim at target, focus eyepiece & enjoy clear, jitter-free view. Field of view: 229 ft. @ 1000 yd.; objective dia.: 47mm; wt.: 36 oz. 9½ x 5 x 3¾". Watertight alum. body. Case & instr. 1-yr. mfr. warranty.
No. 71,792 $150.50 Ppd.

Astronomical Telescopes, see pages 59-66.

Monoculars

Each has case & caps.

7 X 50 With Tripod Socket. Fine-quality; imported; coated optics. Fits any photo tripod. 375 ft. field of view at 1,000 yards. R.L.E.—75; 7mm exit pupil. Wt. 16 oz. **No. 70,639 $30.00 Ppd.**

20 X 50. Has coated optics, prism erecting system, 157' field of view at 1,000 yards. 2.5mm exit pupil. 9" long, weighs only 12 oz. High power, very portable. Imported. **No. 50,152 $30.25 Ppd.**

10 X 20 Pocket Monocular. About 3" long! A high-power, prism-erecting monocular with coated optics. **No. 70,126 $18.75 Ppd.**

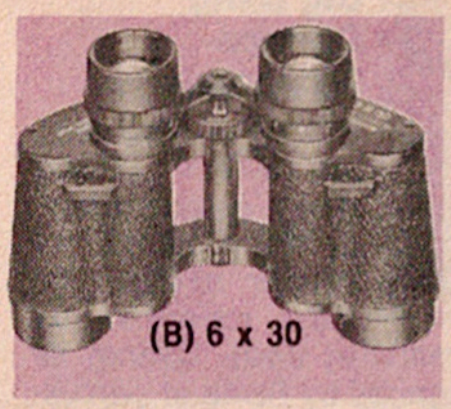
IMPORTED QUALITY BINOCULARS

Edmund Inspected and Collimated

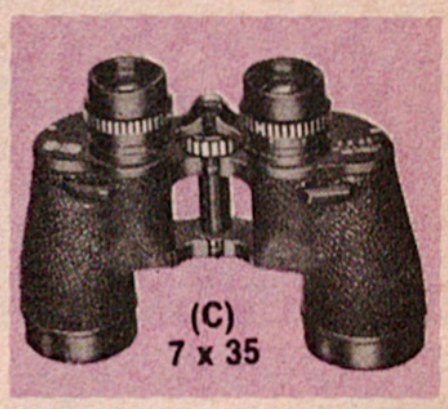
Fine-quality imported binoculars, inspected and collimated by Edmund Scientific Co. All have achromatically corrected oculars and objectives. Oculars, prisms, and objectives are coated. All include case with straps.

OUR MOST POPULAR SIZE!

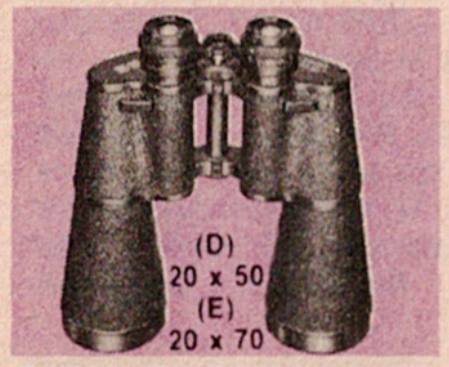
(A) 7 X 50. Excellent for use under poor lighting conditions. Exit pupil matches the maximum opening of the human eye. Zeiss type. See specification table.
Center focus
No. 1525 $44.50 Ppd.



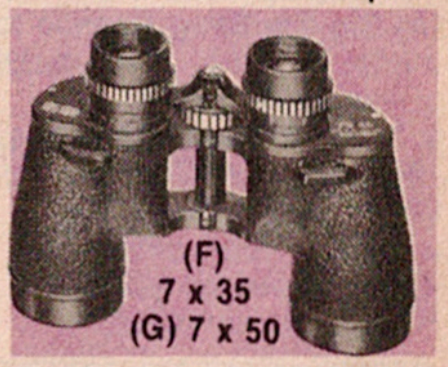
(B) 6 X 30. Recommended for hunting, yachting, nature study, etc. Zeiss type, center focus. See specification table.
No. 1537 $32.50 Ppd.



(C) 7 X 35. For all around use. Especially good for sportsmen, travellers, bird study or race track use. Center focus. See spec. table. **No. 1509 $45.00 Ppd.**



(D) 20 X 50 & (E) 20 X 70. High-power Zeiss type with center focus and extra-large light-gathering objectives. Ideal in flat, open areas & for long range viewing. Use with tripod. See specification table.
(D) **No. 1538 $44.50 Ppd.**
(E) **No. 1540 $89.75 Ppd.**



(F) 7 X 35. Wide Angle. See over 50% more at 1,000 yards than with ordinary 7 X 35. Center focus. Featherweight magnesium body. **No. 1532 $53.50 Ppd.**

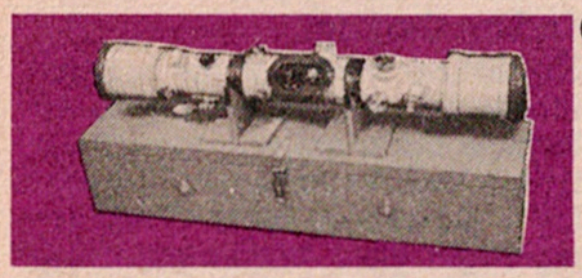
(G) 7 X 50. Wide Angle. See almost 40% more. Center focus. Dust caps incl. **No. 1542 $75.00 Ppd.**

SPECIFICATION TABLE

Item		Field of View at 1,000 Yds	R.L.E.	Approx. Exit Pupil	Weight
(A)	7X50	372 ft.	75	7mm	35 oz.
(B)	6X30	393 ft.	37	5mm	18 oz.
(C)	7X35	420 ft.	37	5mm	21 oz.
(D)	20X50	157 ft.	9.7	2.5mm	36 oz.
(E)	20X70	180 ft.	18.4	3.5mm	50 oz.
(F)	7X35	578 ft.	32	5mm	28 oz.
(G)	7X50	530 ft.	62	7mm	42 oz.

RANGEFINDERS

War-Surplus Bargain! . . . 1 Meter Rangefinder



Cost Navy Approx. $15,000.00
Our Price $450
Ranges from 100-10,000 Yards
Accurate to 12 arc-seconds

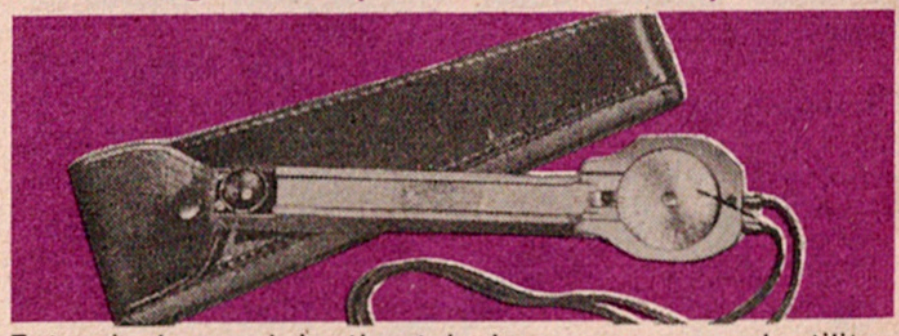
Optics and mount alone are worth the price. This Mark 57, Mod O, 1-meter Erect Image Coincidence Rangefinder is in excellent condition. Use for long range surveying, laying out golf courses, nautical formation alignment. 51" long x 7" dia. rangefinder has yellow, dark neutral, polarizing, and clear ray filters (glass); non-magnetic construction; 2 bearing mounting surfaces (1-1/8 x 5¾" O.D. and 1-1/8 x 5½" O.D.); padded buffers; storage box; instr. Main optical system incl. wedge windows, penta prisms, correction wedge, compensator wedges, objectives, astigmatizers, coincidence prisms, ray-filters, sealing glass, eyepieces. Other systems: correction scale reading, range scale reading, and internal adjuster and calibrator. Approx. 200 lb. fabulous precision optical instrument now a surplus bargain. **No. 85,208 $450.00 T.C.C.**

Bargain! Coincidence-Type Swiss Rangefinder

Orig. Cost $1250. Hand-held; only 7 lb.; fast working; measures 100-2000 ft. by direct viewing. Accuracy: +0.2 ft. @ 100 ft. 6X; 24-7/16" lg. Metal case. Sh. wt. 13 lb.
No. 85,213 $450.00 T.C.C.

80cm, Azimuth-Type. Range: 450-1000 yd. 36" long. Case; tripod; & filters incl.
No. 85,214 $200.00 Ppd.

Field Rangefinder (From 8 to 100 Feet)

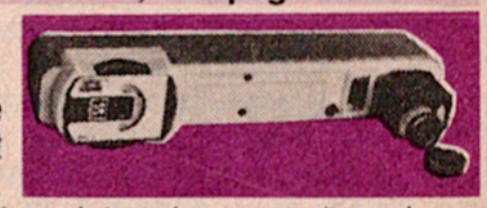


Extensively used in the telephone, power and utility, photographic, mapping, underwriting and insurance, contracting, surveying, home repairs, industries. It is based on the triangulation principle. Look through the eyepiece at a distant object and adjust the calibrated dial until the white image is superimposed on the gold one. Distance to the object is then read on the dial. For distances from 8 to 100 feet; accurate to 2%. Incl. leather carrying case, neck cord and instructions. 8¼" long. Wt. 12-oz. incl. case.
Direct vision model **No. 50,137 $42.50 Ppd.**

Erecting Prism Model for overhead viewing of telephone and power wires. **No. 50,138 $62.95 Ppd.**

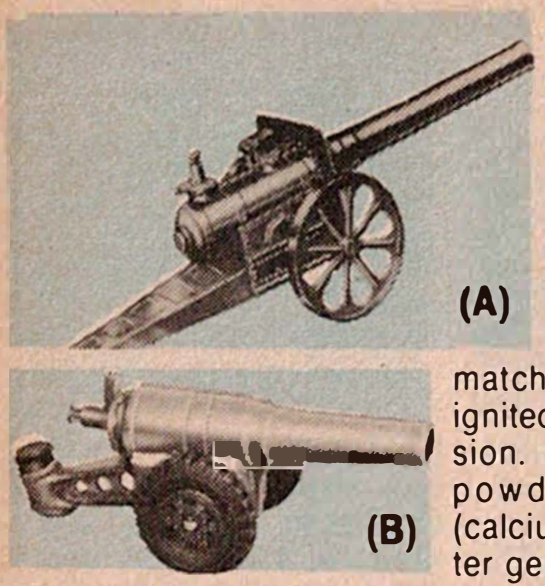
New Optical Tape Measure, see page 11

Portable Rangefinder



Accurate, compact. 1 scale interchangeable pre-computed for direct readings up to 2 miles. Great distance finder & translator. In seconds get an exact fix! 6 x 18 monocular detaches. Only 22 oz.; weatherproof. 210 ft. field of view @ 500 yd. (minimum distance for use: 50 yd.). Less than 1% error @ 100 yd. 1½ x 11". Instr. **No. 71,648 $39.00 Ppd.**
Carry Case & "in use" holster. **No. 71,649 $7.75 Ppd.**

MISCELLANEOUS & HARD-TO-FIND ITEMS

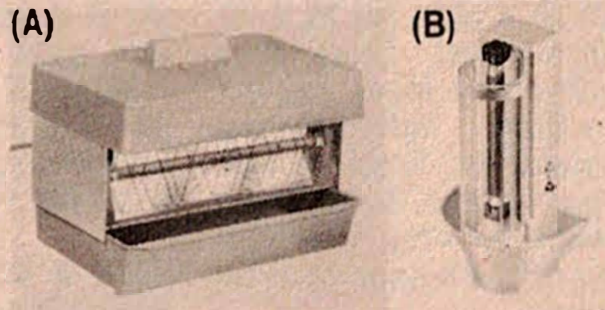


Big Bang Cannon Noisemakers

BOOM!!! Cannons are perfect for holidays, celebrations, military games, or sports events. No gun powder or matches used. Cannot be ignited by flame or percussion. Safe, non-poisonous powdered ammunition (calcium carbide) and water generate harmless gas. Push igniter and cannons give off loud reports. Cast iron bodies. Instr.

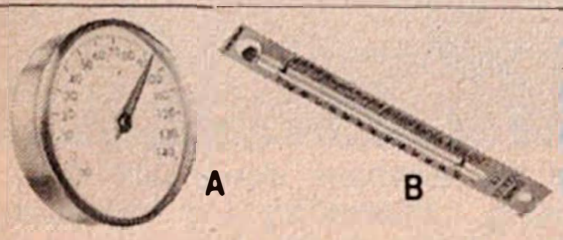
(A) Big Big Bang Cannon for LOUD report. Single shot model over 2-ft. from muzzle to beam. Wt. 5½ lb. Requires ammo below. **No. 71,654* $16.50 Ppd.**
2 Tubes Ammo (+200 shots) **No. P-41,005* $1.50 Ppd.**
(B) Low-Cost Cannon, not quite as loud as above. 60mm single shot model, 9 x ¾" on heavy-duty rubber wheels. 1 tube ammo incl. (approx. 200 shots). Order Ammo above for more. **No. 70,898* $6.95 Ppd.**
*Cannot be airmailed.

Kill Annoying Bugs With Black-Light Traps



Black light, 3-10 times more alluring to most insects than any other, attracts insects which then become unbalanced & fall into water to drown. Traps have genuine, long-wave lamps; easy to clean. 2-yr. bulbs & instr.

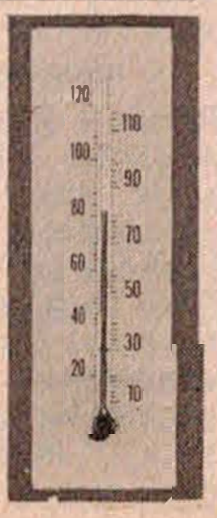
(A) Outdoor Trap. For up to ½ acre of cleared area. Great for backyards, pools, golf courses. Uses grounded electical outlet. Weatherproof. Stands or hangs. 12½ x 7½ x 9½'. 110v AC, 26w.
No. 71,657 $39.95 Ppd.
(B) Indoor Trap. Keep bugs out of bedrooms, etc. 9 x 5" dia. 110v AC, 4w. **No. 71,658 $15.75 Ppd.**



Thermometers Designed To Meet Your Needs!

(A) High Speed Thermometer (1¼" dia.) Determine rapid changes in temperature in 5 seconds in morning air! Check speed and effectiveness of air conditioners in cars, homes, etc. Measures -10 to 150°F in increments of 2°F. Accuracy ± 2%. **No. 40,989 $3.00 Ppd.**
(B) Fahrenheit, Centigrade Combo Thermometer 5¼ x 5/8" body; 4"-long glass tube. —20 to 220°F in 5° increments; —20 to 100°C in 2°. **No. 60,504 $1.15 Ppd.**
Pkg. of 6 **No. P-40,775 $6.50 Ppd.**

Bargain Thermometer Packages



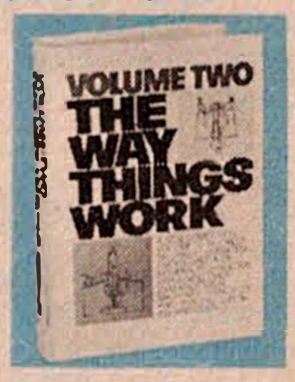
Low-cost, reliable thermometers for hobbyists, schools, labs, experiments, at home . . . ideal for group use and as advertising premiums. Accurate to ±2°. Filled with oil-base, non-toxic liquid. U.S. made. Mounted on gold foilboard.
Pkg. of 12: 3 ea. 2, 3, 4 & 5" (one 3" has horiz. scale; one 5" has both F° & C°.
No. P-41,720 $2.95 Ppd.
(Fifty) 2" type on round edge cards, ideal for calendars. **No. P-41,721 $6.00 Ppd.**
(1,000) 2" type. **No. P-71,598 $99.00 Ppd.**

Crystal Balls To Amaze & Entertain Your Friends

You can be the seer . . . at the next party, bazaar, or friendly get-together! Contrary to popular belief, nothing is ever seen in a crystal ball, but rather in the mind's eye of the crystal gazer. Have fun . . . startle your friends . . . you'll have a "ball"! Also use to improve one's power of concentration, memory, or as a conversation piece. These solid glass Crystal Balls are even used by professional crystal gazers.

Approx. Dia.	Approx. Wt.	Stock No.	Price Ppd.
60mm (2-3/8")	10 oz.	60,770	$15.50
80mm (3-5/32")	25 oz.	60,771	33.50
100mm (3-15/16")	56 oz.	71,171	49.50
125mm (4-7/8")	8 lb.	71,172	97.00

"The Way Things Work" . . . Volumes I & II!



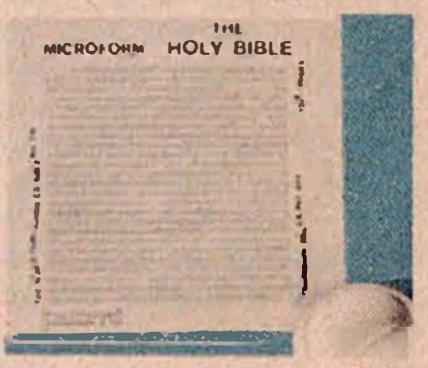
Easy-to-understand encyclopedias of technology with information on hundreds of things that work . . . machines, instruments, processes, appliances, etc. Invaluable for science projects. Both: 5½ x 8½"; 590pp; hrdbk.
Volume I. Did you ever wonder how a ball-point pen works? A telescope? A computer? 1,071 2-color drawings and diagrams explain it all. A reference book you'll use again & again for an understanding of rockets, barometers, batteries, X-rays . . . at least 2 pages on each subject. **No. 9382 $9.95 Ppd.**
Volume II. A companion volume to above, diagramming & explaining the workings of over 1,000 additional gadgets, principles, machines, etc. with instant clarity. Educational & interesting! **No. 9434 $9.95 Ppd.**

Watch Time Fly . . . To The Ceiling!

The deluxe model of the recently introduced ceiling alarm clocks. An invisible beam projects the correct time in digital numbers on the ceiling of a darkened room. Eliminates night-light glare. Wakes you in the morning with a gentle alarm. The numbers are so large that most near-sighted people can read them easily. Walnut sides, burnished gold aluminized top and bottom. 6½" high x 5½" wide; one year factory guar.
No. 71,755 $35.95 Ppd.

The Smallest Bible In The World!

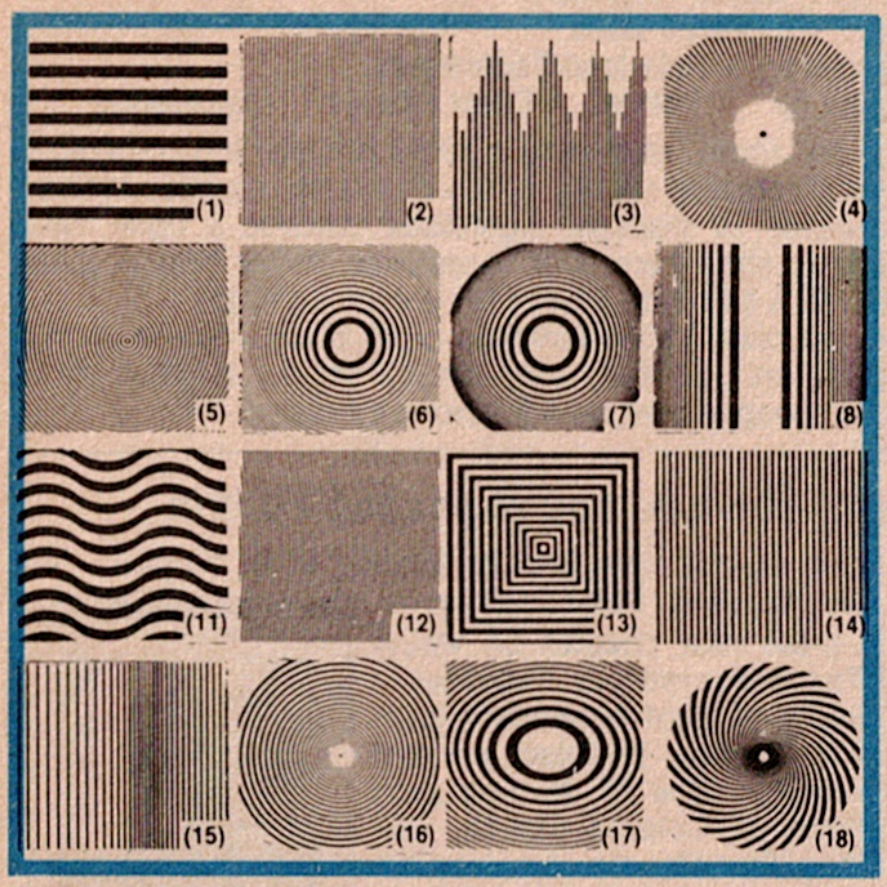
1,245 Pages on a 1-5/16' Plastic Square 0.015" Thick



You thought the Lord's Prayer & Ten Commandments on the head of a pin were something. Here's the whole Bible . . . both Old & New Testaments, 773,746 words . . . printed in a 1-5/16" sq. area! A fantastic area reduction of 62,500 to 1. Each page is only .022" wide. It's just like those taken by the Astronauts to the Moon . . . you need a 100X microscope to read it. Or hook it up to a projector thru a microscope & prism and project parts on a screen. Instr. **No. 41,191 $2.00 Ppd.**
American Freedom Documents. ½" sq. contains: Declaration of Independence; Constitution; Bill of Rights; & all other Amendments. **No. 41,570 $2.00 Ppd.**

LOW-PRICED BIOFEEDBACK MONITOR, SEE PAGE 7

Moiré Patterns



Moiré patterns are made by overlaying precise repetitive figures so their lines almost superimpose. The interesting patterns obtained offer new opportunities in physics, art, math, psychology & design. Study liquid flow & stress, project wild patterns in light shows, use for science fair projects, etc. Dr. Gerald Oster first established the importance of the Moiré phenomenon in "Scientific American" articles. With his guidance, we have prepared the following kits.

"The Science of Moiré Patterns" by Dr. Oster
2nd edition. Contains experiments, new Moiré uses, etc. Illus. 8½ x 11"; 41 pp. **No. 9068 $3.00 Ppd.**

Black And White Kits

Patterns 1-8 on 3¼ x 4 x .020" clear vinyl and 3¼ x 4½" Kromecoat paper (coated, .012" thick). Plus "The Science of Moiré Patterns"; two 3¼ x 4", 150-dot, halftone screens; and a 20-mesh fiberglass screen, 8 x 10½".
No. 70,719 $9.50 Ppd.

As above but without text. **No. 60,464 $6.50 Ppd.**

Same materials as Kit No. 70,719 but patterns 11-18 and their instructions rather than experiment manual.
No. 70,790 $6.00 Ppd.

Kits Nos. 70,719 & 70,790 **No. P-70,791 $15.00 Ppd.**

Moiré Patterns On 3¼ x 4" Photo Negs
Make your own prints; excel. for Overhead Projectors.
Patterns 1-8 **No. 40,822 $11.75 Ppd.**
Patterns 11-18 **No. 40,823 $11.75 Ppd.**

Color Kits . . . $12.50 Each

Get secondary color effects and a variety of Moiré patterns. 8 patterns, each in magenta, yellow, cyan, on 3 clear plastic sheets. A black-and-white opaque print and a solid black image also included for each. **Pat. 1-8 No. 60,530; Pat. 11-18 No. 60,531 For Experimenters With Limited Budgets.** Pattern (4) on 5 sheets; 3 colors, 2 in black. **No. 40,821 $2.00 Ppd.**

8½ x 11" Black & White Patterns

16 pieces in all: 8 patterns on .005"-thick transparent plastic and again on .010"-thick Kromekote.
Patterns 1-8 **No. 60,532 $18.50 Ppd.**
Patterns 11-18 **No. 60,541 $18.50 Ppd.**

Individual Patterns. One transp. one proof **$2.75 ea.**

Pattern	Stock No.	Pattern	Stock No.	Pattern	Stock No.
(1)	60,533	(7)	60,539	(14)	60,545
(2)	60,534	(8)	60,540	(15)	60,546
(3)	60,535	(11)	60,542	(16)	60,547
(4)	60,536	(12)	60,543	(17)	60,548
(5)	60,537	(13)	60,544	(18)	60,549
(6)	60,538				

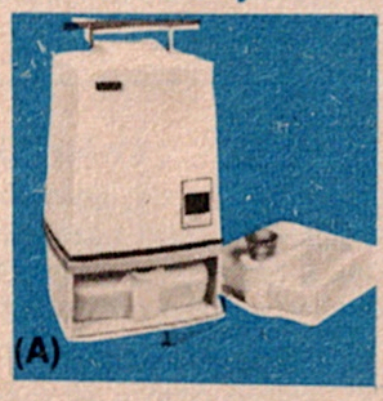
Transparent Acrylic Domes Protect And Accept Displays Unique • Versatile • Great for Aquariums & Terrariums!

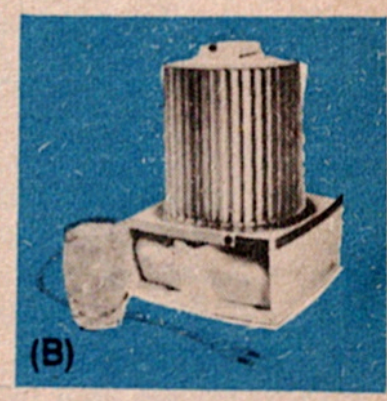
Sturdy, optically-clear plastic domes keep dust, moisture, air currents, insects from displays, models, products, scales, etc. Make table aquariums (see Popular Science article of 7/71) or hanging terrariums (see Mechanix Illustrated article of 4/73). Clear domes of 1/8" acrylic plastic will not discolor, craze, or crack with age. Odorless, non-conductive, & non-toxic. Rim allows domes to be screwed down to protect valuable displays or combined to make a ball.

7" dia. x 3-9/16" deep. **No. 71,710 $3.15 Ppd.**
12" dia. x 6" deep. **No. 80,179 $7.00 Ppd.**
12" dia. x 6" deep (no rim). **No. 80,108 $11.85 Ppd.**
18" dia. x 8¼" deep. **No. 85,216 $14.30 Ppd.**
20½" dia. x 10" deep (no rim). Shpg. wt. 8-lb.
No. 85,178 $24.75 T.C.C.

Now—2 Pure Water Distillers Giving Up To 6-Gals Every 24-Hours

Only 7¢ per gal





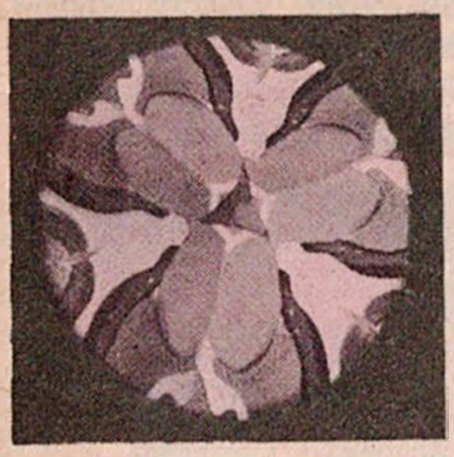
(A) Larger 2-Gallon Capacity Distiller: Plug this Hi-Speed Water Distiller into any outlet, and it silently produces up to 6 gallons of pure drinking water in 24 hours . . . at only 7¢ per gallon. Pure water is great for families for drinking and cooking, for salt-free diet patients; for photo processing labs, for school and scientific labs. Drink pure, fresh water and discover a whole new flavor in coffee, tea, soups, mixed drinks, and juice concentrates. Transform water, regardless of appearance, flavor or chemical compositon, into pure distilled water that meets government specs. Removes rust, detergents, pesticides, chlorine, fluorides, alum, sulphur, etc. Water vaporizes in a Pyrex boiler, condenses in aluminum-finned cover, and flows to a ½-gallon polyethylene receiving bottle. No plumbing hook-up needed: just plug into any 110v, 60-cycle outlet. Shuts off automatically when receiving bottle is full and red light signals complete distillation. 9½" sq. x 16¼" high. Wt. 9-lb. 4 receiving bottles, stoppers & instructions.
No. 80, 155 $190.00 Ppd.

(B) Smaller Distiller. Produces up to 2 gallons in 24 hours. Measures 9½" sq. x 13" high. Wt. 6-lb. 2 receiving bottles & stoppers incl. **No. 80,102 $99.95 Ppd.**

Multi-Lensed Thermo-Plastic Sheeting

10,000 parabolic lenses per sq. in.! Place 1 transparent sheet (.0075" thk.) over another & create floating or sinking moirés, "bubbles", etc. Even print on it! Washable. 12 x 24". **No. 70,734 $2.25 Ppd.**

UNIQUE LIGHTING



Black Light • Strobes • Visual Effect Projectors
Color Organs • MusicVision • Mirrored Balls
Slides • Kaleidoscope Projectors • Polarized Techniques
Light Show Components • Lamps • Paints • Color Wheels • Spotlights

Whether you're black lighting a rec room, equipping a nightclub, putting on a light show, decorating for a dance, synchronizing slides, setting up a trade display, lighting a stage . . . we have what you need! TV stations, nightclubs, combos & light show operators from all over the country shop here. Our experience, know how & giant product selection, provides you with a one-stop source for unique lighting!

Most products in this section are used in the fantastic Light Show Theatre in our Factory Store! Effects come to life on our 96-ft. wrap-around screen. A great show (details on page 162), over 100,000 people have seen it since we finished it!

New Edmund Unique Lighting Handbook—Revised and Expanded Edition

Anyone interested in unusual lighting will find this fact-filled 110 pg., 8½ x 11" looseleaf manual a fascinating and useful tool. Revised and expanded (16 completely new pages!), the book covers every facet of unique lighting and multi-media entertainment from Black-Light to MusicVision, with all the latest information.

We've kept these great chapters:

Flashing Light: Learn about the blinding, blinking, barrage of light produced by strobes.

Overhead Projectors: All-encompassing room effects you can achieve with an overhead projector. Turn walls into living panoramas of color, design, motion.

35mm Projectors: Use one as a theatrical spotlight.

Color Wheels: Tells how you can start "from scratch" making many different types of Color Wheels.

Slides: Interesting effects you can achieve with cut-up Portions of bad slides (image montages), filters (color montages). crystals, paint and moirés.

Also MusicVision, Groovy Movies, Light Sources, Mirrors, Screens, Color Organs.

A great new chapter on **Visual Effects Projectors** includes a history of light projection, gives hints on how to select a visual projector, how to develop such effects as Colored Clouds, Colliding Planets, etc. An easy-reference chart lists materials and descriptions for all effects; details and diagrams for easy construction are also included. The exciting Black-Light section has black-light ping pong and shuffleboard; decorating with black-light at home, on stage, and in nightclubs and discotheques; as well as the practical side of black-light. Turn on the world with this new edition!

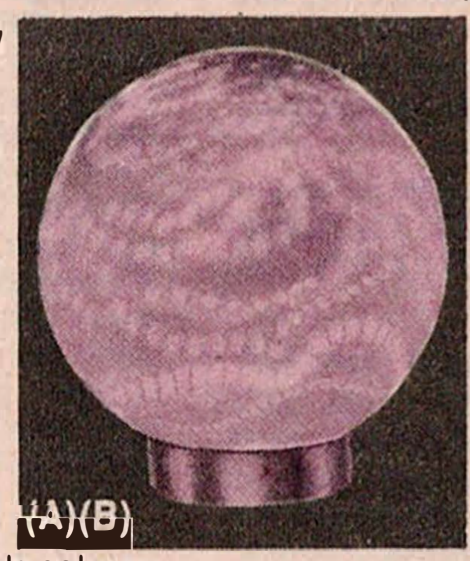
No. 9100 $3.00 Ppd.

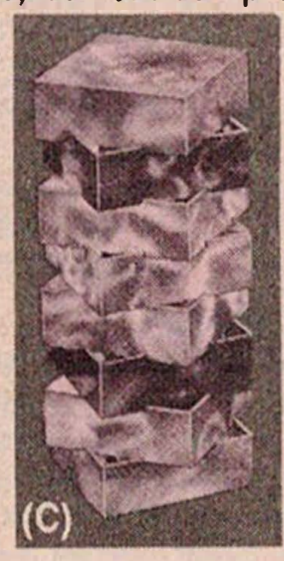
Fascinating Action Lamps . . . Colorful Twinkling Kinetic Art Illusions

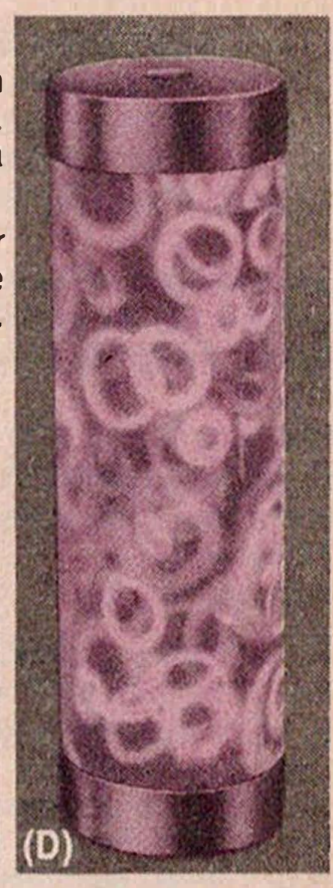
Whirling, twirling, everchanging patterns; colors coliding, blending, blinking; illusions of depth & rotation. Any place you put an Action Lamp instantly comes alive with exciting lighting . . . conversations, discotheques & rec rooms all brighten! All lamps use 110-120v AC. Some have a quiet 4rpm motor that spins the pattern mask; others have silent heat-driven action.

(A) 12" AtmoSphere . . . with "Space Spin" Pattern. Stars, comets, Saturn, meteors & other heavenly bodies float by in various colors all over the 12" dia. opal glass globe. 7" dia. chrome base; heat-driven action. **No. 85,198 $29.95 Ppd.**

(B) 16" AtmoSphere . . . with "Curly Cubes" Pattern. Big 16" plastic globe on 8" dia. chrome base. Stands 17½" high overall. Garlands of ever-changing colored cubes curl & squiggle their way around globe. Motor driven. Shpg. wt. 8 lb.
No. 85,196 $39.95 T.C.C.





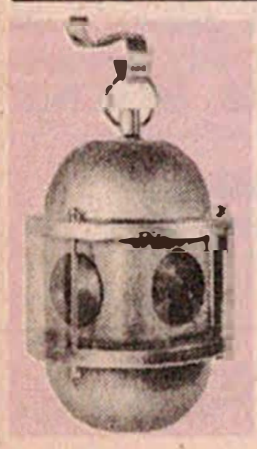


(C) 14" Pagoda Action Lamp . . . with "Abstract Spiral" Pattern. 5" sq. translucent plastic blocks stacked in a colorful alternating array. When it's on, you see twinkling color & shadows dash across each section. Heat driven. **No. 80,141 $14.95 Ppd.**

(D) 25" Color Column . . . with "Rambling Rings" Pattern. Everchanging rings make whole column seem to spin. Translucent plastic; 7" dia. chrome cap & base. Motor driven. Shpg. wt. 6 lb.
No. 80,140 $34.95 T.C.C.

8" with Daisy Pattern. 3 lb. **No. 80,139 $19.95 Ppd.**

16" Hanging AtmoSphere with "Curly Cubes" Pattern. Shpg. wt. 8 lb. **No. 85,197 $39.95 T.C.C.**



Revolving Indoor Light Beacon

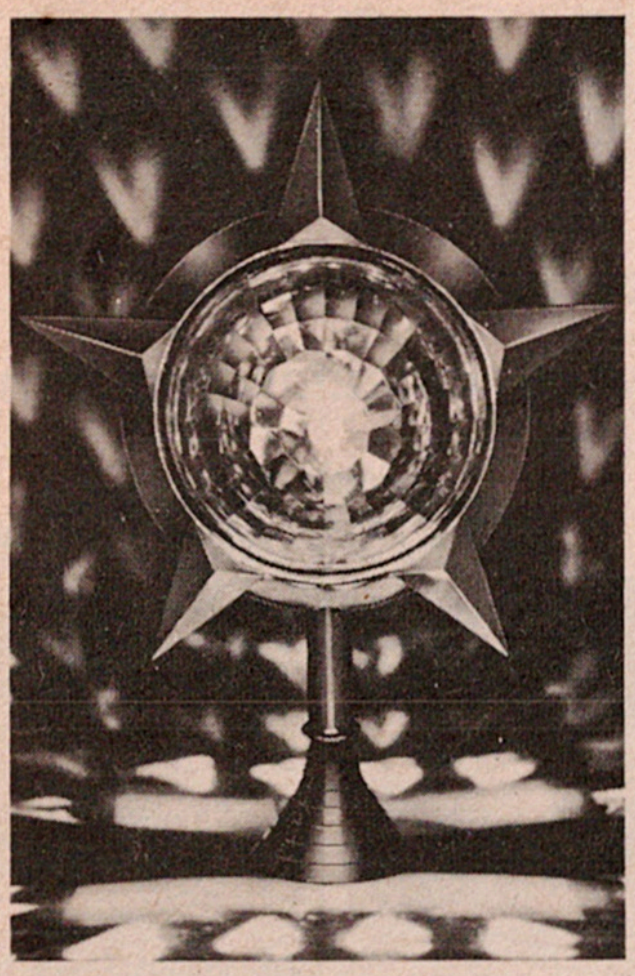
Red, green, blue & amber acrylic Fresnel lenses revolve 360°. 60 rainbow-effect color changes per min. 10¾ x 6" dia. case of gold, anodized aluminum. Totally enclosed, 110-115v AC, quiet motor. 1,000-hr., 25w bulb; bracket incl. U.L. listed. Wt. 2¾ lb.
No. 80,099 $32.50 Ppd.

Outdoor Light Beacon. As above, but weatherproof. **No. 80,100 $40.00 Ppd.**

Crazy . . . Colored . . . Flicker Lights!

Groovy lights that appeal to every generation! The popular G-25 globe shape features a thin carbon filament, which is activated by a magnet inside the bulb to gyrate in a myriad of geometric patterns. Rated for 1,000 hrs. of life; consume 12 watts; fit any standard lamp or fixture socket. Transparent colors. **$3.95 Ppd. Each**

Green No. 41,629 Red No. 41,628 Amber No. 41,630



CREATE YOUR OWN DREAM WORLD

WITH A BEAUTIFUL ROTATING MULTI-COLORED LIGHT

Did you ever wish you could escape into a dream world? Now you can . . . into the dreamy world of moving color! This Rotating Light projects streams of flickering, multi-colored lights that radiate throughout any room. Place it on your table, T.V., fireplace, with displays . . . even on top of a Christmas tree. Makes a tremendous ice breaker for parties—an inexpensive venture into unique lighting. Gives beautiful lighting effects of color and movement. Plastic, star-shaped light's center is a faceted, transparent globe. A louvered drum inside globe rotates from bulb heat. Drum has red, blue, green, and yellow stars which are projected approx. 360° through both sides of the globe and onto your walls as everchanging star points. In addition to enjoying the fascinating light patterns you'll also like watching the faceted globe. Each facet continually changes color and gives the illusion of being a mirror—transparent but yet almost reflective. 9¾" gold star with globe center stands approx. 12" high on bell-shaped base. Lamp, cord, and plug incl. **No. 71,000 $7.50 Ppd.**

2 Extra Lamps for above. **No. P-41,192 $1.25 Ppd.**

Handmade Mirrored Balls

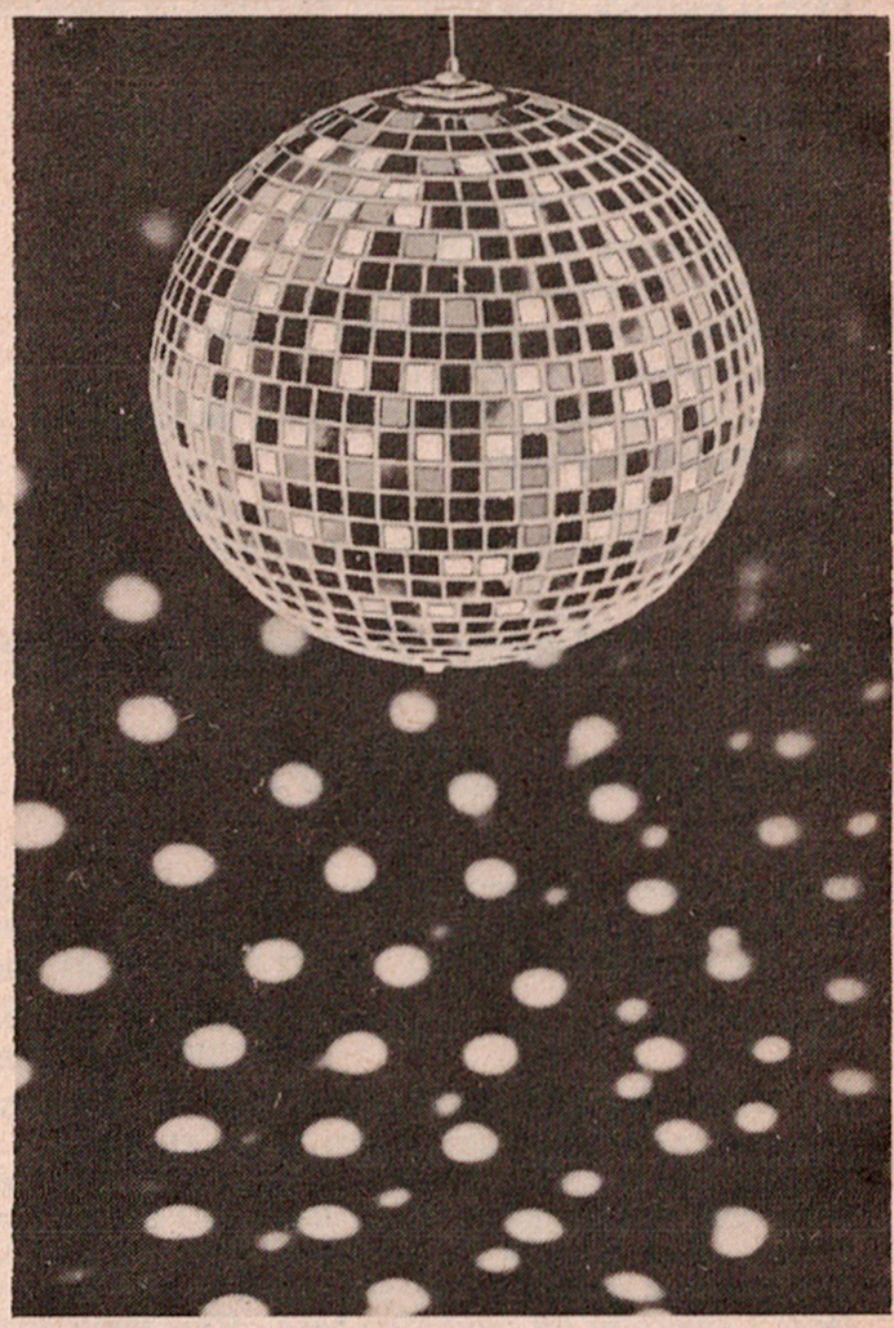
Decorations In The 20's "In" For The 70's

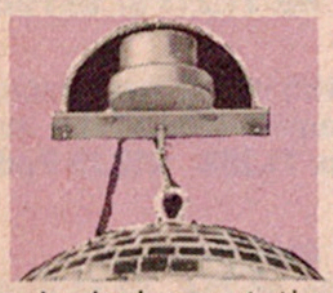
These spherical reflectors rotated and decorated dance halls in the 1920's. Some were used in theaters, hotel ballrooms, and the like. Now—Mirrored balls are perfect for unique lighting effects in ballrooms, discotheques, store windows, hotels, receptions, and at parties, light shows, dances, etc. These are handmade with lustrous, clear glass mirrors . . . up to 1,000, depending upon ball size.

For a really fascinating effect, add a ceiling motor for motion and play lights on the ball. This turns any area into an arena of moving spots of light. Or, just hang one from a ceiling on a wire or ribbon. They create an endless variety of shimmering, decorative effects . . . like a multitude of diamonds. 2 to 6" sizes have ¼" square mirrors; 8 to 16" sizes have ½" square mirrors.

Dia.	Stock No.	Price Ppd.	Dia.	Stock No.	Price Ppd.
4	71,063	6.60	12"	71,066	$32.00
6	71,064	12.50	16	85,180	*75.00
8	71,065	17.50			

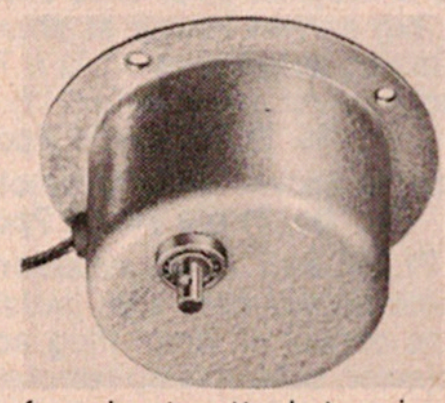
*T.C.C. 6 lb. 8 oz. shpg. wt.





"Turn On" Displays With Low-Priced 4 RPM Motors

AC Ceiling Motor provides the perfect motion for mirrored balls (can be used with most of ours); mobiles (fish really swim, colors dance); and even signs (counter-clockwise rotation to enable reading). Operates smoothly and quietly on 110v AC. 2½ x 2" (1¼" deep) motor, mounted on 4-1/8 x 1¼" face plate; ½" shaft tip with 1/16" hole for S-hook (incl.); wire hanger, Approx. 5-lb. capacity. **No. 60,825 $7.20 Ppd.**



Ceiling Motor

A heavy-duty, ball-bearing motor with a 10-lb. capacity. Shaft rotates at 4 rpm for less than ½¢ per day using 115v AC. Gray-hammertone metal case, 5" dia. x 2½" deep (back to 15/32" shaft's tip), has 4 holes for mounting. Shaft has hole for wire to attach to mirrored balls, displays, mobiles, etc. **No. 60,744 $13.75 Ppd.**

PUT ON YOUR OWN

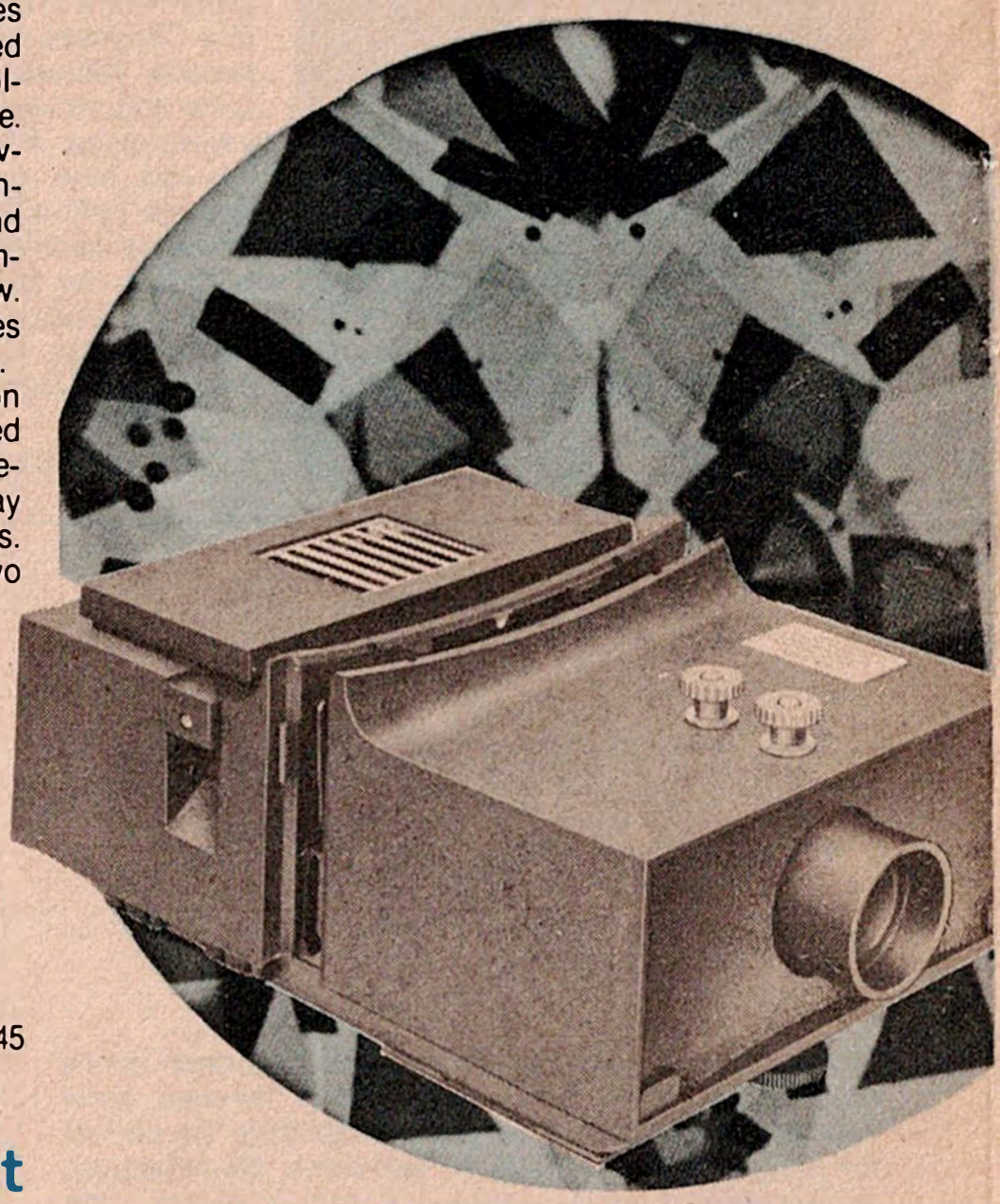
This deluxe visual effects projection set has everything you need... includes new, 3-way kaleidoscope lens

This one set has all kinds of equipment and accessories with which you create beautiful, colorful, projected effects . . . psychedelic spheres; starbursts; wispy, colored clouds; colliding planets, and many, many more. All easy to create, but spectacular to see. Colorful, moving patterns are yours to project in nightclubs and window displays, at parties, discotheques, dances, and special events . . . No special training needed; complete, easy-to-understand instructions show you how. And after a while, you'll be combining the accessories and special-effects wheels to make your own creations.

The popularity of our regular Visual Effects Projection Set and many requests for a kaleidoscope lens have led us to this new, Deluxe Set. It contains a projector, special-effect wheels, unique lenses (including a 3-way Kaleidoscope Lens), motor, brackets, and instructions. Each is available separately and described on these two pages; but here's what you get with this Deluxe Set:

1. **Edmund Visual Effects Projector (No. 71,057)**
2. **3-Way Kaleidoscope Lens (No. 60,818)**
3. **Psychedelic Wheel (No. 71,122)**
4. **Hexidoscope (No. 60,797)**
5. **Colored Window Wheel (No. 71,211)**
6. **Colored Cloud Accessory (No. 71,208)**
7. **1 rpm Motor (No. 60,734)**
8. **Brackets for Special-Effect Wheels (No. P-60,748)**
9. **Complete Instructions**

If you purchased each separately, you'd pay $108.45 You save $8.50 by buying the complete set.



Visual Effects Projection Set

No. 71,295 **$99.95 Ppd.**

Deluxe Visual Effects Proj. Set. Above but with professional model projector (No. 71,248) with 2 AC receptacles & remote control. **No. 71,868 $119.95 Ppd.**

400w CYK Lamp . . . 30% dimmer but 800% longer life. **No. 41,544 $8.50 Ppd.**

1. Edmund Visual Effects Projector. Use for light show projector, spotlight, Music Vision, 35mm projector. . . . bargain priced unit is perfect for these and other effects. Use with all products on these two pages. Features 2 built-in bolts for mounting color, polarizing, special-effect wheels in the slide gate and in front of lens; 3 apertures for regulating beam; 500w lamp; thermostat; fan; 3" F. L., f/3.5 anastigmat lens; wide slide gate for special wheels; big screen image at short projection distance. High impact polystyrene 10-¾ x 7-7/8 x 4-¾", includes instructions and one disc for (12) 2 x 2" slides. **No. 71,057 $34.50 Ppd.**

Remote Control Model Same as above, but with remote control slide changer. **No. 71,002 $44.50 Ppd.**

Professional Model . . . 71,057 with 2 AC accessory receptacles and 20-ft. remote control cord with switch for safe, low-voltage remote control of lamp. Plug accessories right into the projector; control lamp remotely (up to 200 ft. with using ordinary lamp cord or bell wire). **No. 71,248 $54.00 Ppd.**

2. 3-Way Kaleidoscope Lens. Turns any V. P. into a kaleidoscope projector. 3 pattern types. Turn lens to make images move toward, away from, or about center of kaleidoscope pattern. Use with any special effect wheel and projector gate. 8 ft. dia. screen image at 25 ft. **No. 60,818 $20.50 Ppd.**

3. Psychedelic Wheel. Use with any accessory. Glass: 9" dia. vivid colors. **No. 71,122 $15.00 Ppd.**

4. Hexidoscope. 5" tube with 6 front-surface mirrors hexagonally on inside. Fits lens. Great for semi-kaleidoscopic effects. **No. 60,797 $9.50 Ppd.**

5. Colored Window Wheel. Has random, colored windows in opaque background. Use with hexidoscope and all accessories. **No. 71,211 $7.50 Ppd.**

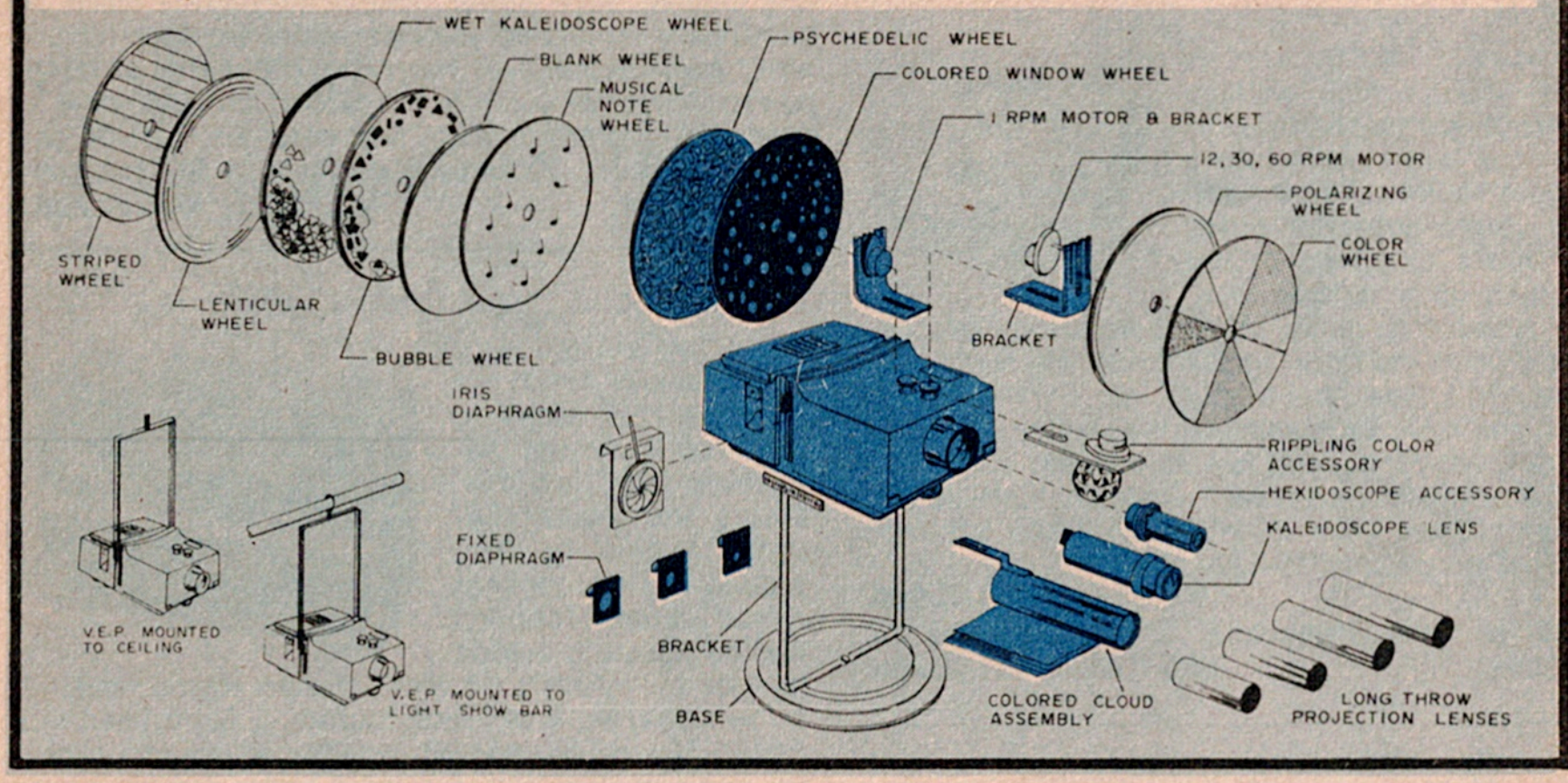
6. Colored Cloud. 6" table lined with mylar. Has special lens and 4" extension. Gives 2 beautiful effects. Has extra mylar for others. Instr. **No. 71,208 $13.75 Ppd.**

7. 1 R. P. M. Motor. With adapter, cord, and plug. **No. 60,734 $7.50 Ppd.**

8. Brackets for Using Special Wheels. Support motor-driven wheels in slide gate and in front of projection lens. Set of 2. **No. P-60,748 $2.50 Ppd.**

LIGHT SHOW !!!

Visual Effects Projector Set . . . components (Color) and Options



Additional Apparatus For Use With The Visual Effects Projector Set

Rippling Color Accessory, multi-faceted, 2½"glass ball, a 12 rpm motor, and bracket. With V.E.P. and a special-effect wheel, it produces a rippling, undulating, floating effect. **No. 71,210 $21.50 Ppd.**

Lenticular Wheel, 9" dia.; plastic; usually used with a 12rpm motor. Spinning in front of projection lens with another special-effect wheel in gate, creates wild whirling, turning, 3-D effects. **No. 71,252 $6.00 Ppd.**

Striped Wheel has 12 stripes, 6 colors. Glass; 9" dia. Use with any accessory or in front of lens. Provides moving colors. **No. 71,256 $7.25 Ppd.**

Window Wheel is identical to the Colored Window Wheel, except that the round windows are clear. You paint them, attach parts of slides on them, etc. **No. 71,242 $4.50 Ppd.**

Musical Note Wheel with hundreds of musical notes. Glass; 9" dia. **No. 71,097 $8.50 Ppd.**

Bubble Wheel, liquid filled; bubbles ooze and cascade between colored plastic. Tops with Kaleidoscope proj. or lens. **No. 71,393 $26.00 Ppd.**

Quick Change Visual Effect Wheels! Magnetic hubs make each V.E.P. do double duty as you easily change wheels as the show's in progress. Pkg. of 2 magnetic hubs. **No. P-41,994 $4.75 Ppd.**

Wet Kaleidoscope Wheel (see page 115).

Universal Mounting Bracket, black anodized aluminum, designed to mount the V.E.P. or Kaleidoscope Projector from a ceiling, on a stand for table use, from a theatrical pipe clamp on a stage lighting rail, or in a variety of other situations. Overall: 10 x 11 x 1". **No. 60,772 $12.00 Ppd.**

Base For Universal Mounting Bracket. Sturdy, black steel, 12" dia., and necessary hardware. **No. 71,235 $8.75 Ppd.**

Adjustable Diaphragm fits V.E.P. for conversion to low-cost spotlight. 3x5x1". **No. 41,210 $12.15 Ppd.**

9" Dia. Discs. Make your own wheels for color, polarizing, kaleidoscopic & special-image projection. Sandwich material between 2 discs or cement it to one. Discs have ¼" center hole. Supplied in pkgs. of 2 discs.

Plastic	**No. P-70,996**	**$4.90 Ppd.**
Glass	**No. P-71,087**	**$4.00 Ppd.**

Low-Cost, Long-Throw Projection Lenses. Match the focal length to your lens-to-screen distance (the longer the distance, the greater the F.L. needed).

5" F.L., f/3.5; for 20-25 ft.	**No. 60,802**	**$8.50 Ppd.**
6" F.L., f/4; for 25-30 ft.	**No. 60,801**	**$9.25 Ppd.**
7" F.L., f/4.5; for 30-40 ft.	**No. 60,800**	**$8.85 Ppd.**
8" F.L., f/5.3; for 40-50 ft.	**No. 60,799**	**$10.50 Ppd.**

COLOR ORGANS . . . TRANSLATE SOUND INTO COLOR!

Color organs are devices used to control groups of colored lamps that are usually triggered by music. Each lamp in the system responds to a certain frequency band and to the intensity of the music. This causes the lamps to blink and vary in brightness in relation to the music's rhythm, volume, and pitch. When used with live music, your radio, stereo, or tape recorder, a color organ system gives flashing, pulsating, colored lighting effects that can really "turn you on."

3-Channel Color Organ Kit

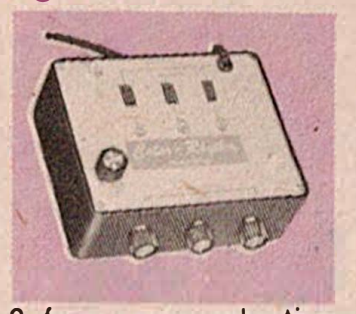
Easy-To-Build! Low-Cost!

No technical knowledge or experience needed! When completed, you have 3 bands of audio frequencies to modulate 3 independent strings of colored lamps (i.e. "lows" as reds, "middles" as greens, "highs" as blues). Just connect hi-fi, power amplifier, radio, etc. and plug each string of lamps into its own channel (max. 300w each). Kit features custom plastic housing, 3 controlled individual SCR circuits, 3 neon indicators, 3 color intensity controls, isolation transformer for protection, & complete instr.

No. 41,831 $17.50 Ppd.

1500 Watt, 3-Channel Color Organ . . .

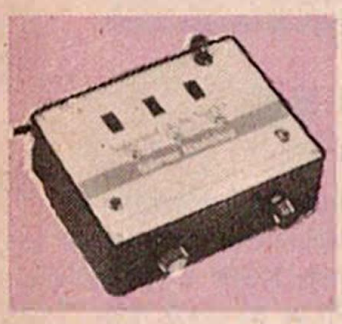
With "Strobe" Rate Control



Provides enough high wattage output (500 watts/channel) to transform a large room into a total light-sound environment! "Strobe" pulse generator drives one or more channels of the color organ (at a variable rate), with or without an audio input. 3 frequency selective amplifiers (with indicator lights) divide the audio (use standard, RCA type phono plug) into 3 ranges: low, medium, and high. Each amplifier is sensitive and active within its given range, and has an intensity control for adjusting relationships between channels. Bakelite and aluminum cabinet. 2¼ x 5¼ x 6¾". Wt 2½ lb. 5-ft. cord with plug. Operates on 110-120v AC, 60 Hz. Instr. incl.

No. 71,428 $59.00 Ppd.

220v, 50 Hz, Color Organ with "Strobe" Rate Control. (Like above.) **No. 71,429 $63.95 Ppd.**

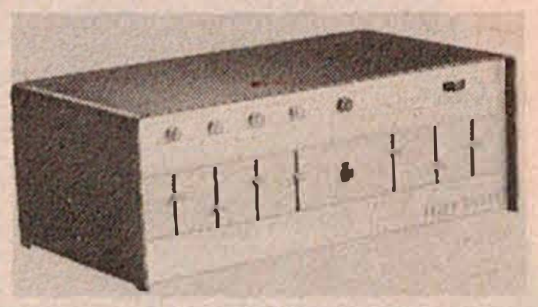


Sequential Flasher

Controls lights in sequence like "Chase Lights" on marquees. Has variable rate control & can be audio activated (from signals as low as 250-millivolts)! Built-in sensitivity control; powers (3) 500w AC outlets in sequence at a selectable rate. 2-3/8 x 5-1/4 x 6-3/4" bakelite & alum. case; channel lights; 115v AC; wt. 2 lb. 6 oz.; instr.

No. 71,430 $87.50 Ppd.

4-Channel Color Organ . . . 3,000 Watts



Use this unique console, designed to operate from microphone and/or auxiliary mono/stereo inputs, to create a dynamic color background for live or recorded voice and music programs. Blend audio signals in any proportion by varying 2 slide-type gain controls. Color intensity controlled by separate intensity slide controls (each with indicator light) so that 4 selected colors can be balanced to produce the most pleasing color effects. Simultaneously control all 4 channels with single master gain control without upsetting display. Each power control individually fused. 4 individually controlled frequency-selective color channels, each capable of handling 750 watts of lamp power; Attractive 4 x 6 x 11" cabinet of black vinyl & aluminum. 3-pronged plug; 5-ft. cord. Wt. 5 lb. 10 oz. 117v AC, 60 Hz, 20 amps max. (built in RFI suppression). Instr. incl.

No. 71,427 $266.50 Ppd.

Easy-To-Build "Light Chaser" Kit

Once you build it, you can use any serial arrangement of lamps to produce a similar sequence of "on-off" states that make the lights appear to "run around" in that configuration. Speed control makes possible a wide latitude of "chase". Kit incl.: custom plastic housing, circuit boards, 9 semiconductors, 3 lamp channels (max. 150w each), modern 3-stage ring counter circuitry, and complete instr. Full-wave bridge rectifier power supply assures lamp brightness.

No. 41,833 $22.75 Ppd.

150-Watt Dichroic Spotlights

Pure, full, rich color with cooler lamp operation for color organs.

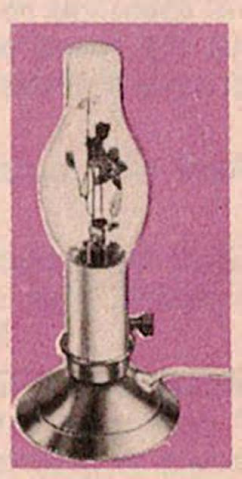
$8.25 Ppd. each

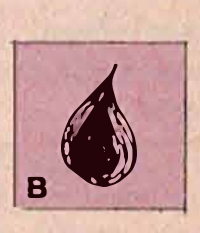
Red **No. 71,048** Blue **No. 71,050**
Green **No. 71,049** Yellow **No. 71,051**

Enchanting Rare-Gas Glow Lamps . . . Attractive Illumination For Any Room

Glow Lamps have electrodes shaped like flowers, birds, flames that flicker, etc. Each provides soft, cool & delicate lighting. Only a penny's worth of electricity for every 10 hrs. of use! Extra-long life. Each requires a standard Edison-type socket. Attractive brass base & socket (No. 60,766) listed below.

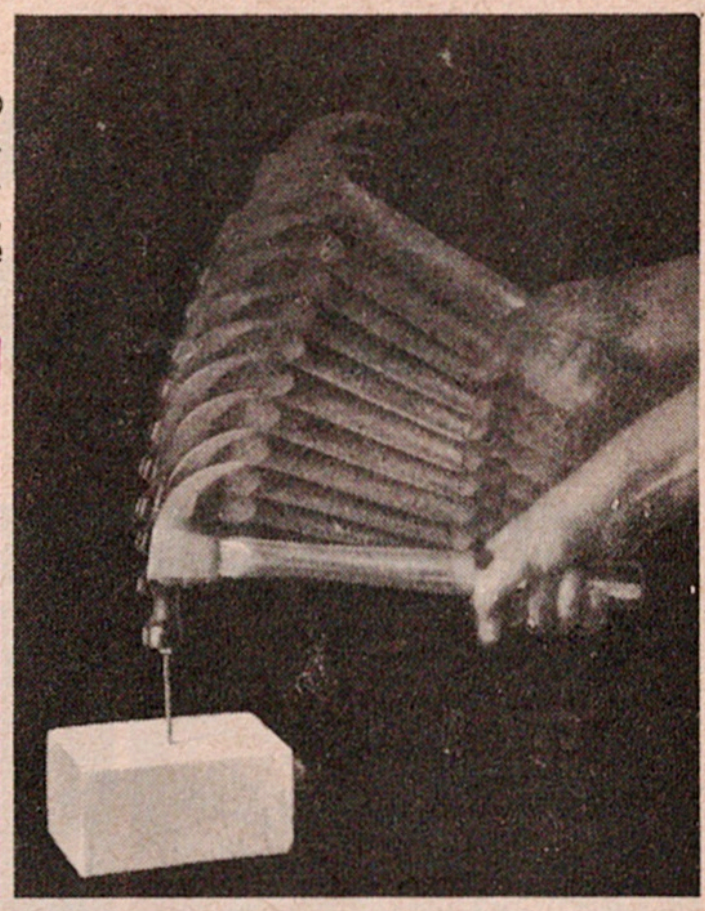
Illus.	Stock No.	Price Ppd.	Electrode Shape	Glow Colors	Bulb Shape	Height On Base No. 60,766
A.	41,195	$2.50	I Love You	rose-orange, green	rd.	8¼"
B.	41,200	2.00	Flicker Flame	flame-orange	flame	7½"
	41,196	3.98	Bird Bouquet	rose-orange, green	hur.	8¼"
	41,198	3.98	Lrg. Field Flwr.	rose-orange, green	hur.	8¼"
	41,202	1.50	Twin Horses	rose-orange	cyl.	6¾"
	41,197	3.98	Bluebird & Flwrs.	purple-blue, green	hur.	8¼"
	41,199	3.98	Blue Bouquet	purple-blue, green	hur.	8¼"
	41,206	1.50	Crucifix	rose-orange	rd.	6½"
	60,766	4.50	Brass base . . . Edison-type socket, switch, cord with plug.			
	71,149	8.00	Lamp No. 41,198 (Lrg. Field Flower) and Base No. 60,766.			





STROBE LIGHTS "Freeze" Motion

NOW . . . a variety of 7 strobes starting at only $4.75 and ranging to $365! Electrical, mechanical, and even black-light strobes are included. Fascinate your friends with psychedelic, stop-action lighting effects. You'll find strobes are fantastic for light shows, combos, discotheques, parties, and even displays! Electronic strobes are great for old-time movie effects and shadow jumping.



STROBE CHECK CHART

Coverage area and flash rate . . . at-a-glance! Gauge the size you need and order economically. (Distances & area are in ft. & sq. ft.)

Unit	Max. dist.	Recom. dist.	Max. area	Recom. area	Flash Rate (per sec.)
(A) Mini-Strobe	20	12	400	144	Adj. 3-10
Mini-Strobe (F.R.)	20	12	400	144	Fixed: 7
(B) Winky	25	15	625	225	Adj. 0-10
(C) Color Strobe	35	30	1225	900	Fixed: 6
(D) B-L Strobe	15	12	225	144	Adj. 0-25
(E) The Blue Box	35	25	1225	625	Adj. 1-20
(F) The Big Bopper	50	42	1524	760	Adj. 1-15
(G) Super Strobe	91	62	7350	5000	Adj. 1-12

(A) A Mini-Strobe To Take Everywhere!

Compact; solid state; portable; inexpensive lamp replacement. In darkened room, this tiny strobe (2¾ x 4 x 1-3/8" thk.) can produce stop-motion effects and make posters seem to "come to life." Excellent signaling device for night use. Requires one 9v battery (not incl.). Instr. **No. 41,443 $8.95 Ppd.**

Fixed-Rate Strobe Light (identical to above except with fixed flash rate of 7 flashes/sec.). Good for approx. 50,000 flashes per lamp. Batteries not incl.
No. 41,767 $4.75 Ppd.

4 Extra Lamps **No. P-41,444 $1.00 Ppd.**

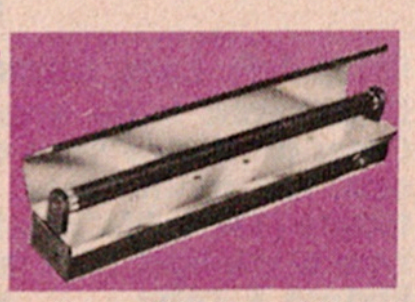
(B) Winky . . . "it's super for parties!"

A low-priced, good-looking, adjustable strobe that is reliable and compact. The newest innovation in repeating strobe light equipment . . . it utilizes the popular 50 watt/sec. Xenon flash tube in conjunction with control circuitry that provides high performance. Under normal usage tube provides over one million flashes. Plastic case; approx. 4 x 4 x 9". Wt. 1½-lb. **No. 71,342 $24.95 Ppd.**
Flashtube Replacement **No. 41,248 $6.50 Ppd.**

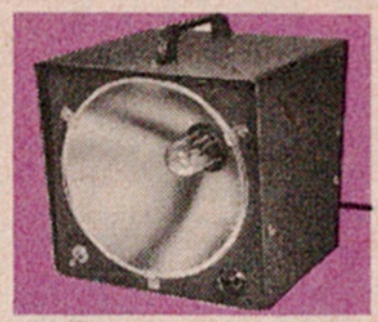
(C) 3-Color Mechanical Strobe

Combines dashing bright colors with a stroboscopic effect! Sets walls and posters ablaze with red, blue, & green color tones. Rotating wheel mechanically provides the "chromatic machine-gun" effect. All metal case (9 x 9 x 6"). Adj. hanger & 100w reflector floodlamp incl. Wt. 8½ lbs. Uses 110v AC. Note: Does not "stop motion" as effectively as Xenon strobes, but the color effect is really terrific! **No. 71,423 $45.00 Ppd.**

(D) 18" Black-Light Strobe



Adjustable flash rate from very slow (1 flash per several sec.) to a continuous glow (beyond visual flicker perception . . . 1,500 flashes per min.)! Excellent light output & lamp life. Hi-polish reflector. 3 x 5½ x 18". 15w, 18" b-1 tube incl. **No. 71,480 $42.95 Ppd.**
Replacement Bulb **N0. 60,126 $ 6.95 Ppd.**



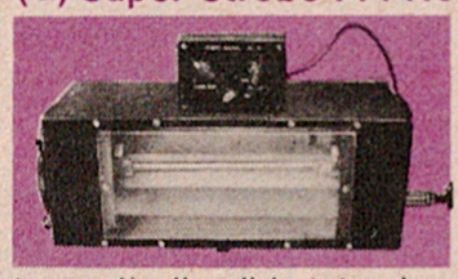
(E) The Blue Box

A strobe built to our own rigid specifications! High quality components are used throughout to give you a really bright reliable strobe. Easily replaced plug-in Xenon flashtube gives from 3-5 million flashes. Externally replaceable fuse. Metal case: approx. 7½" cube. 6-ft. grounded cord & plug for max. safety. 110v AC operation. Wt. 5-lbs. 9 oz. **No. 71,703 $118.00 Ppd.**
Flashtube replacement **No. 41,814 $23.45 Ppd.**

(F) The Big Bopper

Powerful strobe has a 200 watt/sec. Xenon, flashtube which gives from 1-5 million flashes. Rugged, aluminum case (8 x 8 x 7") has mounting bracket, rubber feet, and 6½" reflector. Uses 115v AC; fused. Includes remote control; single flash capability; 5-ft. cord; manufacturer's warranty; and instr. Wt. 9¼ lbs.
No. 71,346 $225.95 Ppd.
Flashtube Replacement **No. 41,158 $16.15 Ppd.**

(G) Super Strobe . . . Now Has Remote Control!

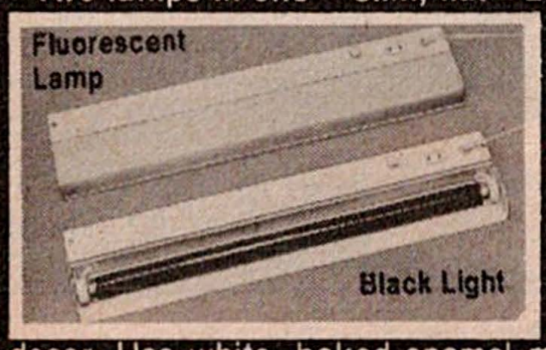


The perfect strobe for heavy-duty and professional use now includes a versatile new remote control. Bright, bright flashes and continuous, problem-free operation. Quality features: 1) all solid state circuitry; 2) 7¾" long-life Xenon flashtube (Phillips #XOP-7) gives wide area (60 x 90 ft.) illumination for over 5 million flashes; 3) fan-cooled motor with switch; 4) curved, rigid, reflector (10 x 5"); 5) sturdy metal case (15 x 6 x 6"); 6) uses 115v AC max, input 600w; 7) heavy-duty 9-ft. cord with 3-prong plug; 8) remote control has flash rate control (50w sec./flash max. at 1-12 flashes/sec.), intensity control, on-off switch, and 15-ft. cord & plug; 9) mfg. warranty (except flashtube); 10) wt. only 10 lb. 11) instr.
No. 1604 $365.00 Ppd.

Convert Strobes To Black Light . . . Just place this ultraviolet filter over strobe's reflector and flashtube. Gives wild black light strobe effects. Glass; long-wave; 8-5/8 x 9-5/8 x 1/8". **No. 71,083 $11.25 Ppd.**

BLACK LIGHT

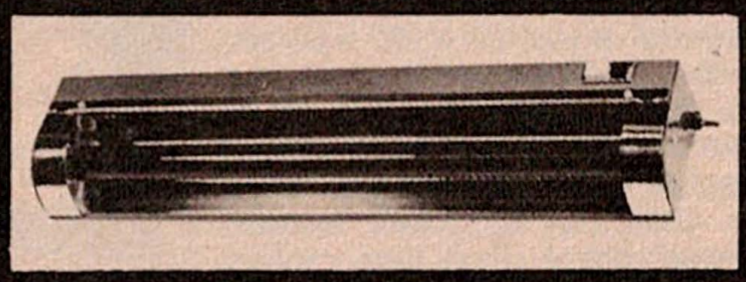
Black-Light Bargain Pack . . . Dual Use
• Two lamps in one • Slim, flat • Low-priced



Designed for versatility & economy, use as a 15w black-light or change to regular fluorescent tube (also incl.). Perfect for posters, displays & black-light decor. Has white, baked-enamel metal case (18 x 3-3/8 x 1-5/16"); modern plastic diffuser (fluor. use only); built in 110v outlet for accessories or other lamps; sleek, slim design for mounting over posters, on the ceiling, under shelves, counters, cabinets; push-button switch; side & back mounting holes. Both black-light & fluorescent tubes (15w, 18") and instr. incl. And, the price is right.

No. P-71, 720 $14.50 Ppd.

Fire-Red Polished-Reflector Black Light . . . A Great Buy!

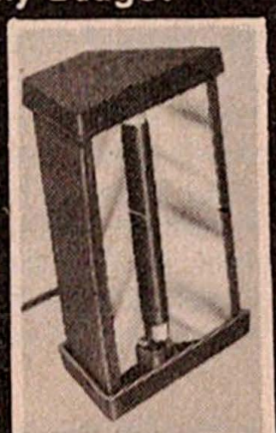


A real beauty with bright color outside & super illumination from the inside. High polished, curved inner reflector allows greater than average illumination from the long-life 15w bulb. This large 18" fluorescent black-light bulb, housed in a sprayed & fired red fixture, adds color and excitement to window displays, bedrooms, cabinets, fluorescent paintings, etc. Comes with push-button on/off switch (on fixture) & holes for vertical or horizontal mounting. Operates on 115v AC; overall size 18 x 3½ x 2"; wt. only 2½ lb.

No. 71,829 $17.95 Ppd.
Replacement Bulb No. 60,126 $6.95 Ppd.

Mini Black-Light Fixture For Any Budget

Fluoresce the setting of your next party or banquet . . . eerily light up your seasonal decorations! Create a whole new atmosphere for decorative, display, and mod lighting effects. Also an excellent unit for detecting counterfeit money. Safe, high-intensity black-light blue fluorescent tube (4w, 6" long). Walnut finish. 2¾ x 4½ x 6½". 110v AC.



No. 60,897 $13.50 Ppd.
Replacement Bulb No. 41,599 $4.50 Ppd.

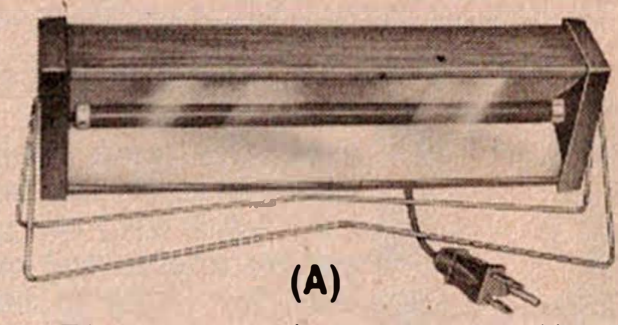
DON'T BUY ANY OTHERS BEFORE READING THIS:

Black-Light Mighty Mights

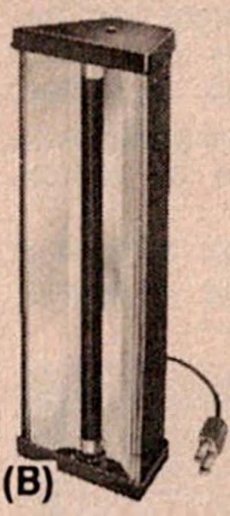
8w bulb with reflector shines almost like 40w!

YOUR BEST BUY!

These get our highest recommendation!



(A)



(B)

These relatively small (12") black-light fixtures give surprisingly bright black light for their size. The reasons are their mirror-finished, reflectors and 8-watt, hi-intensity black-light bulbs. Self-starting bulb provides up to 5,000 hours of safe, long-wave (3660Å) black light for mod parties, psychedelic decors, unique lighting shows, holiday deckings, and theatricals. Two fixtures available: an indoor fixture (B) and one that's for indoor and outdoor use (A). Both use 110v AC, have UL approved cords, and have shockproof removable end caps (for convenient bulb replacement).

(B) Indoor Black-Light Fixture. Stand it upright or use it on its side. Lightweight (1¾ lb.), sturdy, has gold-tone aluminum case.

No. 71,274 $14.95 Ppd.

(A) Indoor-Outdoor Black-Light Fixture. Adds atmosphere to evening entertainment, poolside parties, back-yard doggie roast. Also good for Christmas or Halloween decorations. Has weatherproof front shield and special ballast for quick start in cold weather. Removable swivel stand allows you to "aim" the light and also upright and horizontal use. Has gold aluminum housing, plastic shield, grounded cord. **No. 71,299 $19.95 Ppd.**

A & B Replacement Bulb
No. 60,899 $4.95 Ppd.

Giant 4-Ft. Long Black Light

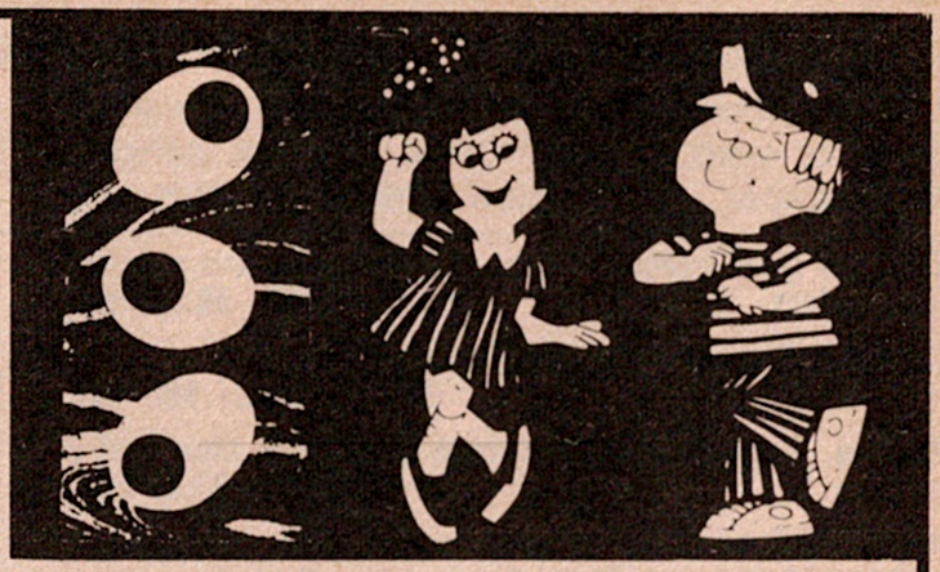
Black light large areas . . . 15 ft. or better. Great for dance floor or stage coverage, party sets, rec room decor. 115v, 60Hz, strip metal fixture (1¾" x 2¾" x 4-ft.) includes a 40w filter-type black-light BLB lamp. Rapid start ballast.

Fixture & Tube No. 80,168 $24.25 Ppd.
Fixture Only. No. 80,171 $9.95 Ppd.

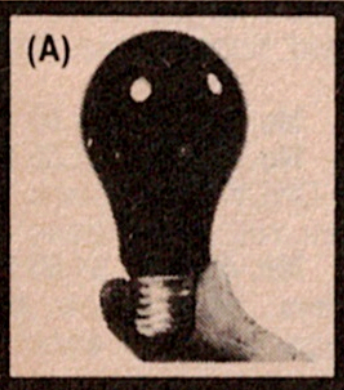
BLACK-LIGHT STROBE, SEE PAGE 109.

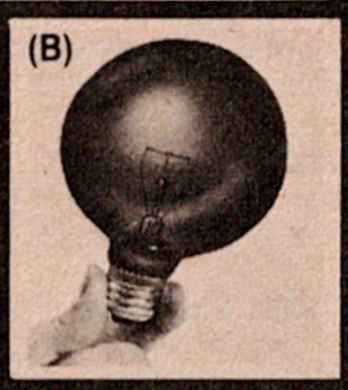
. . . THE OUT OF SIGHT LIGHT

Get with the 70's . . . decorate with black light. Fluorescent objects glow brightly under its rays to make fascinating decorative effects . . . 1) Wild basements & rec rooms; 2) messages readable only under black light; 3) teen bedrooms that glow with black light & posters; 4) unusual, attractive displays. Practical to: 5) detect counterfeit bills . . . 3 out of 4 fakes fluoresce (No. 71,830 is ideal!); 6) security use at dances; 7) make rock collections glow eerily; or 8) in criminology, medical, & sanitation fields.



Regular Edison-Base Black-Light Bulbs





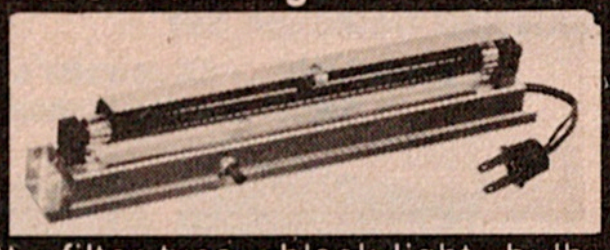
We've had 100's of requests for Edison-base black-light bulbs! They are nowhere near as good as our other black-light tubes & fixtures . . . but we've added them because you asked for them. There are some advantages: they are inexpensive, convenient, & screw in and out quickly and easily. Use several throughout a room to enhance lighting effects. Although not as bright as our other black lights they are useful for posters & displays that are close to bulbs Fit any household lamp.

We've tested many Edison-base black-light bulbs available & found many to be of too inferior quality because they burn too hot & give off little illumination. These are best by far:

(A) 75-W. 480-hr. life. **No. 41,873 $2.50 Ppd.**

(B) 150-W. Here's a new super Edison-base. Has all advantages & disadvantages of 75w. 100's of black-light hrs. **No. 60,981 $3.75 Ppd.**

Black-Light Fixture With Long Wave Bulb



This 110v fixture measures 10 x 1½" x 1¼" and comes complete with a 6-watt, filter-type, black-light bulb. Ideal for mounting in display cabinets, over fluorescent painting, in windows, etc. (fixture should be within reach, however, as a push-on/push-off button on unit must be pressed to turn on and off). Provides appreciable black-light illumination to distances as great as 10 feet or better. Operates in the 3200-4000Å range. **No. 70,364 $14.95 Ppd.**

Replacement Bulb No. 60,124 $ 4.75 Ppd.

Black-Light (Ultraviolet) Fixture Facts

Types of Ultraviolet (UV) Light Sources: some substances fluoresce only under short-wave UV (2537Å), others under long-wave UV (3660Å), and still others under both. Short-wave UV can harm eyes and skin unless precautions are taken. Most of our lamps are the long-wave type which is completely safe.

Ultraviolet Booklet. Contains 40 black-light experiments. 7 x 10"; 48pp.

No. 9360 $3.00 Ppd.

Black-Light Filter-Type Bulbs, Long Wave

Easily and quickly turn any fluorescent fixture into a Black Light!

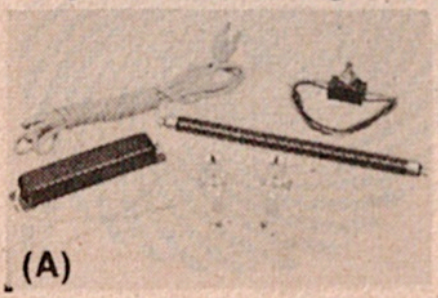
Stock No.	Wattage	Tube Length	Price Ppd.
41,599	4	6"	$4.50
60,124	6	9	4.75
60,899	9	12	4.95
60,126	15	18	6.95
71,362	20	24	14.50
80,116	40	48	19.25

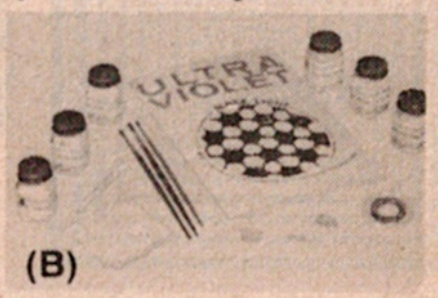
Non-Filter Type Black-light Bulb. Transmits visible & long wave UV light. 6 watt, 9" long. Can use filter below. **No. 60,565 $2.60 Ppd.**

Ultraviolet Filter Glass, Long Wave

No. 60,127 2 x 8 x 1/8" thk. **$8.40 Ppd.**

Long-Wave Black-Light Lamp & Accessory Kits


(A)



(B)

Materials for building your own light unit plus instructions and supplies for 40 experiments! Complete 110v. Black-Light Fixture Kit incl.: 6w filter-type b-1 bulb; starter; switch; (2) 2-pronged clips; cord; 2 wire nuts for splicing wires; & complete instr. Accessory Kit has materials for beginning experiments with fluorescent rocks; painting with "living" light, writing secret messages, invisible detection methods, etc. Invisible water paints, ink & dye; tracer powder; fluorescent elastic; rock specimens; crayon; brushes; experimental papers & plastics; and our $2.50 Ultraviolet booklet (No. 9360) incl. **No. 70,256 $22.95 Ppd.**

(A) B-L Fixture Kit only **No. 70,587 $12.00 Ppd.**

(B) Accessory Kit only **No. 70,586 $11.50 Ppd.**

Make Your Slide Projector A Black-Light Spot!

Ultraviolet long wave glass filter for insertion in slide projector (gates or in front of lens) for controlled & directed black-light illumination. 1-7/8 x 1-7/8 x 1/8" thk.; wt. 1 oz.

No. 41,568 $2.50 Ppd.

DECORATING IDEAS!

Black Lights plus accessories on the next page offer many ideas for decorating at home, in discotheques, on stages, anywhere to make it unusual.

Black-Light Accessories? You Name It, We Have It!

. . . Everything you need to decorate a wall, a room, or even yourself! Chalk, crayons, pencils, spray, paper, paints, glow tablets, invisible ink, posters, string, even body paints. Get some . . . and have a ball!

Chalk. 6 giant pieces, 1" sq. x 3" in cardboard sleeves. Asst. colors. **No. P-41,063 $6.00 Ppd.**

Crayons. Pkg. of 8. Assorted colors. **No. P-41,062 95¢ Ppd.**

Pencils. Pkg. of 7. Red, orange, 2 greens, blue and 2 yellows **No. P-60,669 $3.25 Ppd.**

Paper. Six 11 x 14" sheets: aurora pink, arc yellow, rocket red, Saturn yellow, signal green, fire orange. **No. P-70,363 $2.00 Ppd.**

Trace Powder. Invisible except under black light. 2 oz. by volume; wt. ½ oz. **$1.90 Each Ppd.**
Green **No. 40,417** Yellow **No. 41,069**
Orange **No. 41,068**

Water Glow Tablets. 1 gives fluorescent glow to 15-30 gal. of water. Inside use lasts 2-3 weeks. Outdoors, in sunlight, 1-3 days. Blue (for fountains, etc.). **No. P-41,070 $1.50 Ppd.**

Invisible Ink. For rubber stamp use as pass out mark on hands at school activities, patrons at dances, etc. Stops gate crashers. Invisible under ordinary light. 1-pt. **No. P-60,665 $7.40 Ppd.**
Special Stamp Pad **No. 41,084 $1.35 Ppd.**

Elastic String. Accent hair, clothes, gifts, tree ornaments, etc.; hang greeting cards; make fluorescent collages, mobiles; bead jewelry; decorate windows; use as guide-strings on maps & charts. 10 yd. each of 6 colors on individual spools: lemon yellow; red; orange; green; blue; cerise. **No. 41,221 $4.50 Ppd.**

Fluorescent Body Paint. Non-toxic water colors for use as body paints (or for posters). 2 oz. jars. Pkg. of 6: pink, yellow, green, white, red & orange. **No. 41,598 $3.95 Ppd.**

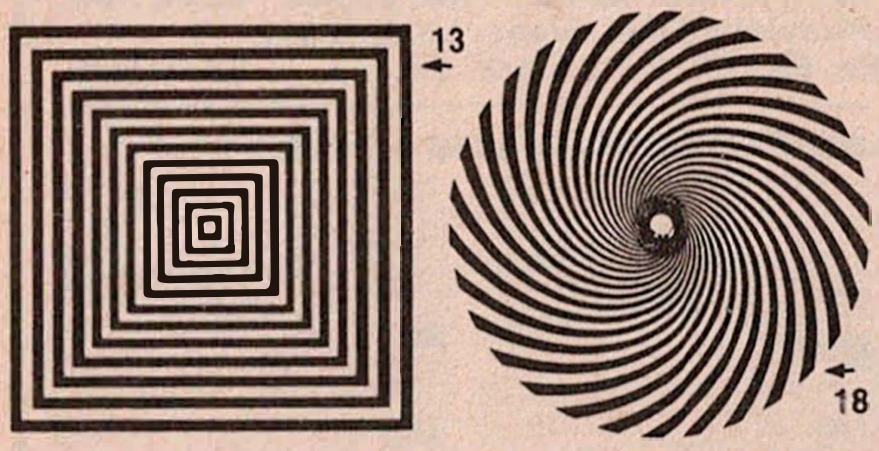
Acrylic Tempera Paint. 6 brilliant colors: pink, blue, orange, yellow, green, red. Vivid fluorescense. Water-soluble; non-toxic; 7/8 oz. ea. **No. 60,874 $2.50 Ppd.**
As above; not acrylic. **No. 60,882 $2.50 Ppd.**

Invisible Tempera Paint. Seen ONLY under black light (glows a brilliant blue)! Non-toxic; water base; 7/8 oz. **No. 41,547 $1.00 Ppd.**

Black-Light Pigments. 6 powders: blue, yellow, blaze orange, green, red & fire orange. Mix with water, oil, lacq., wax, etc. 0.9 oz. ea. **No. 41,523 $4.75 Ppd.**

Convert strobes to black light by placing this UV filter over strobe. Glass; long wave; 8-5/8 x 9-5/8 x 1/8". **No. 71,083 $11.25 Ppd.**

Big 23 x 35" Fluorescent Moiré Posters



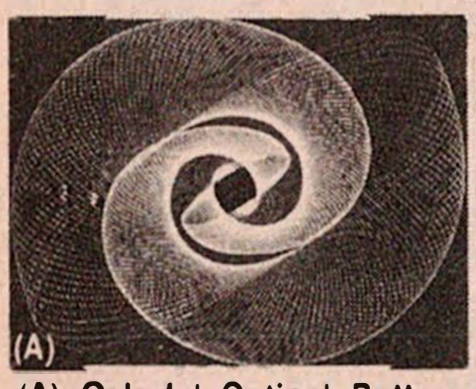
These giant posters fluoresce in brilliant colors esp. under black light. Create unusual Moiré effects using combinations of poster, and transparencies. Avail. on 70 lb. Tuftex poster or on 5 mil polystyrene transp.

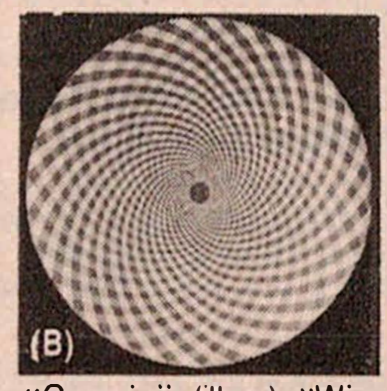
Pattern	On	Yellow, Pink &	No.	Price
4*	Paper	Orange, Black	82,045	$1.75
12*	Paper	Green, Orange, Black	82,047	2.25
12*	Polystyrene	Green, Clear	82,051	2.65
13	Polystyrene	Green, Clear	82,052	2.65
18	Paper	Orange, Black	82,046	1.75
18	Polystyrene	Clear	82,050	2.50

*See illustration on p. 103.

"Turn On" A Wall With Black-Light Posters

• Bedroom • Den • Discotheque • Bar • Rec Room

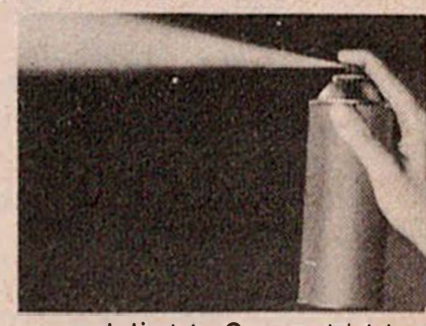




(A) Colorful Optical Patterns. "Cosmic" (illus.) "Wizard" (ea. 24 x 36"), and "Phew" a brilliant sunburst in orange, yellow, and red (34 x 34"). **No. P-80,164 $6.75 Ppd.**

(B) Moire Patterns. "Pow", "Pop" (illus.) (ea. 34 x 34") and "Zap" (24 x 36"). **No. P-80,165 $6.75 Ppd.**

Black Light Spray



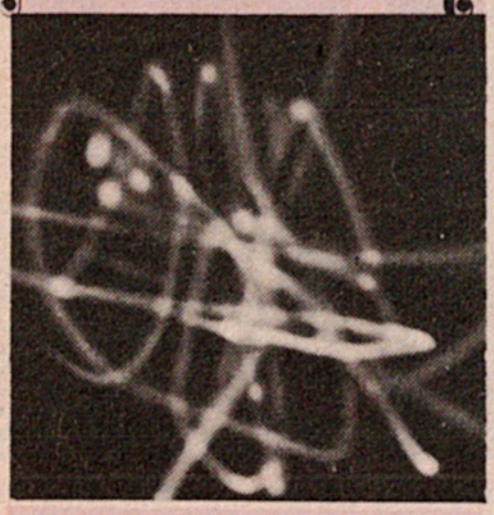
Transform things made of plastic, glass, wood, metal, styrofoam, papier mache, even fresh flowers into eerie, luminous night-dwellers. Spray glows bluish-white under black light, yet is invisible under normal light. Spray hidden messages on walls or posters, double the appeal of party and holiday decorations, create exciting costumes, and much, much more. Washes off with any dry-cleaning fluid. 13-oz. usable contents. **No. 71,276 $3.50 Ppd.**

Counterfeit Detection Set

• Black Light • 5X Jeweler's Loupe
• Secret Service Manual

This set pays for itself when you spot that first phoney $20 bill. Over $4,800,000.00 in counterfeits were detected last year. Imagine how much more is in circulation; don't you get "taken". Set provides the material & the know-how to spot bogus bills, coins, forged money order and gov't. checks, etc. Is a greasy coin "legit"? What are those mysterious blue & red fibers on bills? What do you do when you catch one? Set contains 7½ x 4 x 4" black-light fixture and longwave 4w bulb (3 out of 4 phoney bills glow a light blue under black light); 5X jeweler's loupe for checking bill's printing details and paper; and the Secret Service's fascinating 20-pg. "Know Your Money". **No. 71,862 $19.95 Ppd.**
For effective detection, we recommend bulb replacement before 2,000 hours:
Replacement Bulb **No. 41,599 $4.50 Ppd.**

Music Vision



Pattern from one instant of Chicago's "Fancy Colors."

See Music Perform To Itself Orbits And Figure 8's . . . Wild Waves . . . It's Great

Enjoy music in a spectacular new way with MUSIC VISION—listen to one of your favorite songs, and actually see it in action . . . twirling, dancing, jumping, undulating . . . in shapes of cirlcles, bands, dots, orbits, and waves of everchanging colored light . . . keeping time with the "beat" and in line with its intensity. Each song has its own unique, MusicVision pattern in a rainbow of color. Parties, bandstands, recreation rooms come alive with MusicVision.

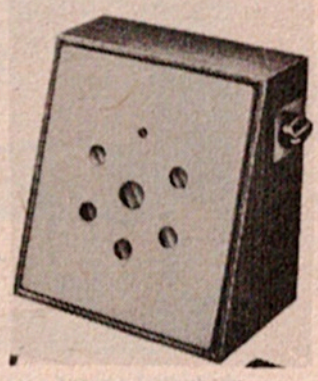
MusicVision's moving forms are reflections from small mirrors that react to sound vibrations. Components include light source (35mm projector is ideal), speaker, color wheel, front surface mirrors, special rubber membrane. Music vibrates speaker causing air in the speaker cone to move the rubber membrane with mirrors. Light source projects light through rotating color wheel onto moving mirrors. We offer complete sets, kits, and individual components for your own MusicVision system.

"Introduction To MusicVision."

16 fact-filled pages loaded with important information about MusicVision. How it works, how to use it, how to build it. Discusses parts, units, audio sounds . . . everything you need to know. Plenty of illustrations. **No. 9096 25¢ Ppd.**

MusicVision Sets

Just add light source & music. You get Motiondizer (speaker, membrane, mirrors); color wheel, stand, motor; 3 beam apertures; & instr. incl. Easy to set up & use. 2 types: cemented mirrors (CM) create atom orbits for small areas; hanging mirrors (HM) create "wild waves" for large areas. 2 sizes: 8 & 12" speakers.



8"CM Set	**No. 71,030**	**$38.75 Ppd.**
8" HM Set	**No. 71,131**	**$42.00 Ppd.**
12" CM Set	**No. 71,032**	**$51.50 Ppd.**
12" HM Set	**No. 71,130**	**$53.50 Ppd.**

Low-Cost Do-It-Yourself Kit . . . Easy To Build

Everything you need to make an 8" motiondizer & 9" color wheel. Color wheel stand & housing for motiondizer not incl. **No. 71,009 $19.95 Ppd.**

Parts To Build Your Own Systems

Motiondizers. Consist of mounted speaker, front surface mirrors attached to rubber membrane, volume-pattern control. Ready to use.

Size	Size	Number	Price Ppd.
8" CM	10¾ x 10 x 6½"	70,999	**$27.25**
8" HM	10¾ x 10 x 6½"	71,109	**29.50**
12" CM	14¼ x 13-7/8 x 9"	71,027	**34.00**
12" HM	14¼ x 13-7/8 x 9"	71,112	**36.95**

Speakers . . .

8"	**No. 70,994**	**$5.50 Ppd.**	**12"**	**No. 70,993**	**$7.50 Ppd.**
			4"	**No. 70,998**	**$1.77 Ppd.**

3 ft. sq. Rubber Membranes

0.01" thick, regular	**No. 60,710**	**$3.00 Ppd.**
0.006" thick, for ultra thin mirrors	**No. 60,751**	**$3.50 Ppd.**

Front Surface Mirrors

Get **only** one bright, sharp reflection instead of two hazy ones obtained from a regular mirror. Clear, sharp, reflected images are a must for MusicVision patterns.

Mirror Assortment	Mirrors	Stock No.	Price
8" CM	7	60,715	$7.95
8" HM	7	60,716	12.00
12" CM	9	60,717	9.00
12" HM	9	60,718	14.90

Note: CM assortments have undrilled mirrors. HM type mirrors have small drilled holes for hanging.

Individual, Thin Front Surface Mirrors

Dia. Mm	No.	Price	Dia. Mm	No.	Price
21	**30,621**	**$2.25**	60	**41,166**	$1.75
21	***30,627**	**1.75**	60	***41,167**	**2.25**
30	**30,622**	**1.20**	12	**†30,624**	**1.25**
30	***30,628**	**1.80**	18	**†30,625**	**1.50**
40	**30,623**	**1.40**	25	**†30,626**	**1.65**
40	***30,629**	**2.00**	* hanging holes		

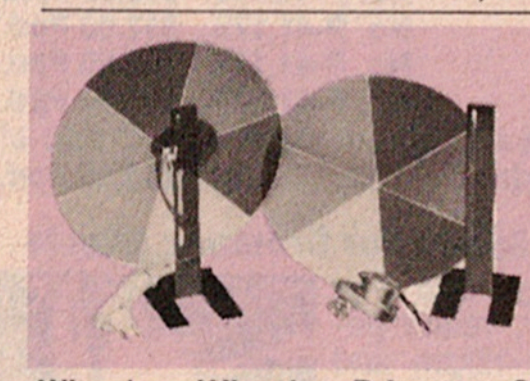
†ultra thin (.15mm); others 0.38-0.44"

MusicVision Starter Kit . . . Only $6.00

Economical kit for do-it-yourselfers! 5 front surface mirrors, 12 x 12" rubber membrane, (3) 1 x 3" filters (pink, green, blue) & instr. for creating MusicVision from your old speakers. **No. 71,095 $6.00 Ppd.**

Compact, Portable Unit

Great for combos, displays, at home. Place on floor, hang from wall, etc. Attach to audio source, plug in & it's ready to go with wild MusicVision patterns. 12 x 5" dia. alum. tube contains everything . . . speaker, membrane, light source w/6.5v bulb, 4 front surface mirrors, etc. Also incl. color filters. 110-120v AC; 4½ lb. **No. 71,124 $39.50 Ppd.**

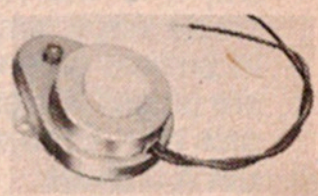


Color Wheels and Parts

Clear plastic wheels with transparent colors in pie-shaped wedges of yellow, blue, lavender, red, green, & purple. Wheels have ¼" center hole.

Wheel Dia.	Wheel Only	Price Ppd.	Complete Motorized Unit: Wheel, stand, 12 RPM motor	
6"	**No. 71,115**	**$4.75**	**No. 71,006**	**$15.25**
9	**No. 71,116**	**5.00**	**No. 71,007**	**15.50**
12¾	**No. 71,117**	**7.00**	**No. 71,008**	**17.50**

Motors. Each has a special hub on the shaft to accommodate and steady color wheels with ¼" center holes. Incl. wing nut, 6-ft. cord and plug. CCW rotation.



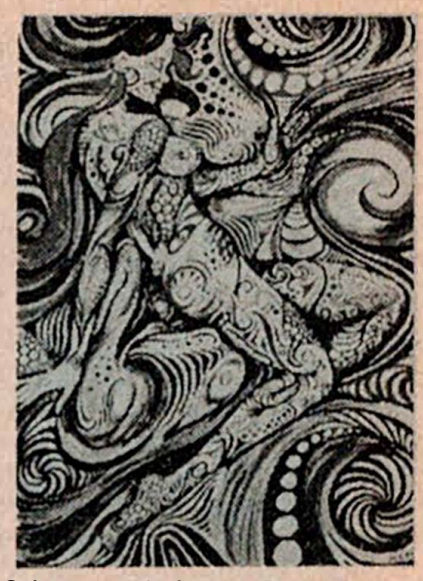
R.P.M.	No.	Price	R.P.M.	No.	Price
½	**60,791**	**$7.50**	30	**60,763**	**$7.50**
1	**60,734**	**7.50**	60	**60,733**	**7.50**
12	**60,714**	**7.50**			

Stand. Holds any of the above wheels and motors. 8" high. Metal base is drilled for permanent attachment to any surface. **No. 71,118 $2.75 Ppd.**

6v AC Portable Spotlight

Ideal light source for MusicVision, Mirrored Balls, etc. Provides bright, narrow long beam of high intensity light (60,000 beam candle power). Head rotates approx. 170°. Metal; gray wrinkle finish. 4-7/8 x 4½ x 4-3/8" folded. No. 4515 bulb incl. **No. 71,010 $27.45 Ppd.**

Psychedelic Slides



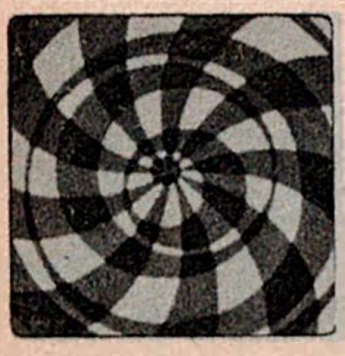
Created by Hollywood's premier special lighting effects man—Bob Beck! Colorfully effective, 2 x 2" (all 35mm) transparencies that put "Pazzazz" in any slide show. Incredibly vivid blotches wispy pastel streaks, muddled moirés randomly colored crackles & crystals, kindergarten-type artwork, rips, tears, scratches, smears . . . the works!

Psychedelic Slides offer a more controlled & well defined type of pattern. Vivid & stark. 81 slides ea.

Set A **No. P-60,749 $22.50 Ppd.**
Set B **No. P-60,750 $22.50 Ppd.**

20 Special Effect Slides project as flowing free-forms. Aqueous "accidents" of indescribable beauty. **No. P-41,253 $5.50 Ppd.**

81 Fluorescent Psychedelic Slides. 70 from Bob Beck & 11 from California artist Henry Hill. Vivid, simulated 3-D effects created thru black-light art forms using fluorescent inks & paints. **No. P-60,904 $22.50 Ppd.**



POLARIZED SLIDE SETS

Beautiful slides that have motion. Require a polarizing spinner in front of projection lens (or use our Polarized Color Projector, No. 71,098, below). Really makes your light show come alive with movement. All are mounted super slides.

Polarized Color Sets . . . Kaleidoscopic Patterns

Set A	12 slides	**No. P-41,170**	**$6.00 Ppd.**
Set B	12 slides	**No. P-41,178**	**$6.00 Ppd.**
Set C	12 slides	**No. P-41,179**	**$6.00 Ppd.**

Polarized Psychedelic Sets . . . Geometric Patterns

Set A	12 slides	**No. P-41,169**	**$12.00 Ppd.**
Set B	12 slides	**No. P-41,175**	**$12.00 Ppd.**
Set C	12 slides	**No. P-41,176**	**$12.00 Ppd.**
Set D	12 slides	**No. P-41,177**	**$12.00 Ppd.**

Polarizing Spinner Kit with 30rpm motor and 6" disc of polarizing material. Instr. **No. 71,132 $13.50 Ppd.**

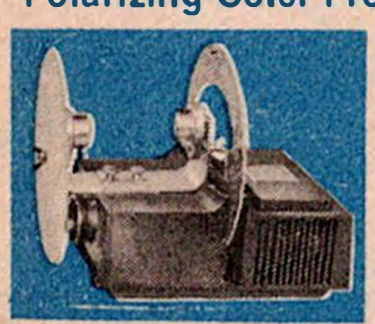
Polarized Crystal Slides For Dramatic Effects

Take Crystal Slides, add any 35mm slide projector, rotate polarizing spinner at 1-12rpm and colors change & seem to move! Glass mounted crystallized organic chemical, Mylar (enhances color), & polarizing material mounted in a single 2 x 2" slide only 1/10" thk. Resorcinol crystals create wispy, amorphous patterns in brilliant greens, blues, reds, etc. Acetanilide crystals are jagged & rigid with shades of brown, gray green & pale blue. Each set has 4 Resorcinol & 1 Acetanilide.

Set A 5 Slides **No. P-41,382 $10.00 Ppd.**
Set B 5 Slides **No. P-41,381 $10.00 Ppd.**

Polarizing Spinner Kit with 1rpm motor and 6" disc of polarizing material. Instr. **No. 71,686 $13.25 Ppd.**

Polarizing Color Projector W/Accessories



Projects a variety of patterns in beautiful, changing, blinking colored shapes from a wheel that has no color at all! Amazing! Polarization of light creates the colors! This is our V. E. Projector (pg. 100) with a number of special accessories: 9" wheel sandwich of birefringent plastic & polarizing material; 9" polarizing spinner wheel; 1 & 30rpm motors with cords and plugs, brackets for both wheels; rotary slide disc; and instr. Note: easily converts to regular 35mm slide projector (using rotary slide disc) or a V.E. Projector. **No. 71,098 $62.95 Ppd.**

Transparent Paints For Slides And Lamps

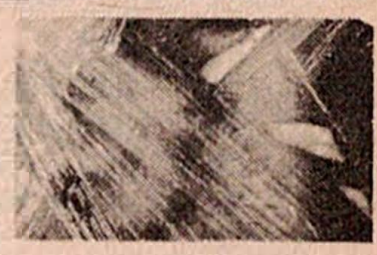
With this set of 12 transparent paints you can create unique painted slides, kaleidoscope wheels, color wheels, light show effects, color ordinary lamp bulbs, etc. Fill your projector with slides you've painted and project your own art gallery or light show. Paint consistency ideal for flow painting & texturing. Set incl. (12) 2 oz. bottles of transparent paint (colors listed below), 1 pint of thinner, & instr. **No. 71,067 $17.25 Ppd.**

16 oz. Bottles of Paints . . . $5.50 Each Ppd.

Color	Stock No.	Color	Stock No.
Golden Amber	71,076	Orange	71,077
Urban Blue	71,071	Flesh Pink	71,078
Canary	71,080	Purple	71,079
Emerald Green	71,073	Cardinal Red	71,068
Olive Green	71,074	Ruby	71,069
Magenta	71,070	Turquoise	71,072

1-Pint Can of Thinner **No. 71,081 $3.60 Ppd.**

Transparent Paint That Crystalizes!



Easily make the most beautiful psychedelic slides you've ever seen! Just dab paint onto slide. As it dries, many individual "splintered" crystal patterns spread out in all directions. Make color wheels, windowed room dividers, Christmas balls, etc. Reasonably durable once dry (in about 24 hrs.) 2 sets of six 2-oz. bottles available. Each set makes over 900 slides. Instr. incl.

I. Orange, tropic green, turquoise, violet, black and brown. **No. P-71,247 $5.00 Ppd.**

II. Red, green, blue, clear and fluorescent pink. **No. P-71,246 $5.00 Ppd.**

Make Accessory Polarized Color Wheels

Everything you need: two 9" discs that fit projector No. 71,098 (at left); birefringent plastic material; polarizing material, and instr. **No. 71,100 $5.50 Ppd.**

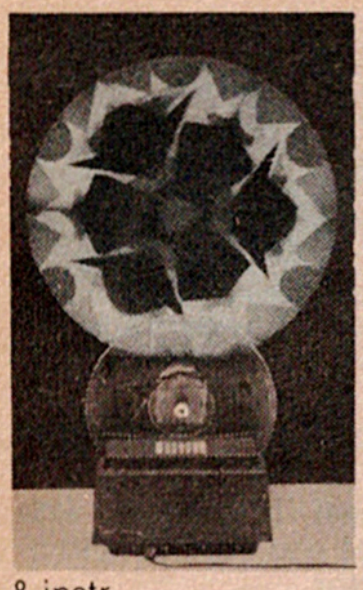
Polarizing Spinner Disc

A 9" plastic polarizing spinner wheel to use with above. Needs 30rpm motor (not incl.). **No. 71,099 $8.25 Ppd.**

Polarizing Material Bargains

Make your own wheels or experiment! Sheets of polarizing material, 6 mil thick, 32% average light transmission. Use for polarized slides too!

9 sheets (approx. 9 x 22" ea.) **No. P-71,871 $15.00 Ppd.**
2 sheets (approx. 9 x 22" ea.) **No. P-71,872 $4.00 Ppd.**



Kaleidoscope Projectors

Large Screen Images At Short Projection Distances

Kaleidoscope Projectors that give fascinating, ever-changing, kaleidoscopic images! (Accept thick special effects wheels easily!) 2 models, identical except for kaleidoscope wheel. Both project a variety of 6-segment kaleidoscopic images perfect for any light show. Each incl.: 500w, blower-cooled lamp; 3" projection lens; thermostat; kaleidoscope wheel; 1 rpm, 115v motor; & instr.

Projector With Liquid Kaleidoscope Wheel:
9 x ¼" thk. plastic wheel contains 100's of bright multicolored, plastic circles & irregular shapes floating in a viscous fluid. As wheel turns, suspended pieces of plastic move to give you an infinite variety of beautiful kaleidoscopic images. **No. 71,121 $98.00 Ppd.**

Projector With Dry Kaleidoscope Wheel:
9 x 1/8" thk. glass wheel painted & textured with bright, colorful, transparent paints. Gives beautiful kaleidoscopic image. (After 1 revolution patterns repeat but not noticeably.) **No. 71,106 $87.75 Ppd.**

Wheels Available Separately:

Liquid Wheel (as above) **No. 71,107 $27.00 Ppd.**
Dry Wheel (as above) **No. 71,122 $15.00 Ppd.**
9" Bubble Wheel. Bubbles ooze, expand, and slip between colored plastic pieces. **No. 71,393 $26.00 Ppd.**
Extra Lamp for above projectors **No. 41,154 $5.65 Ppd.**

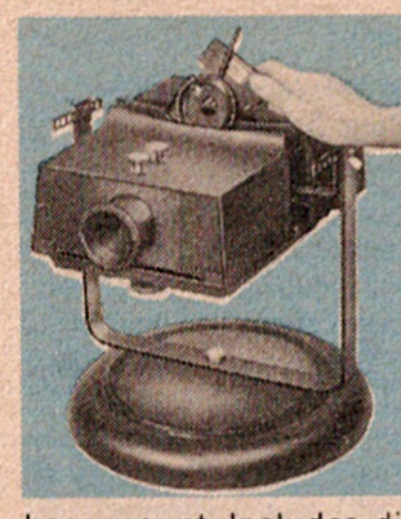
Lenticular Screens For Light Boxes

Lenticular (lenslike) screens are perfect for light boxes because they seem to elongate lamp filaments and help to create unusual and attractive effects.

12 x 16 x 1/8"; 44 lines per inch **No. 80,130 $3.00 Ppd.**
24 x 24 x 1/16"; 64 lines per inch **No. 82,053 $8.00 Ppd.**

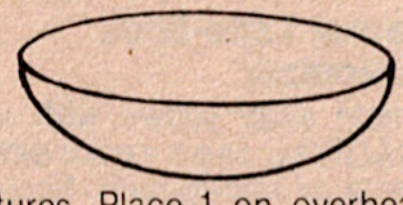
See Sound & Music With A Color Organ Lamp

Ideal for parties, displays, etc. Colors flash & pulse in hypnotic synchronization with any sound within 50 ft. (records, conversations . . . sometimes even whispers as low as 30db). Watch rhythm, beat, high & low frequencies as you hear them. Audio-receiver picks sound waves out of air & transforms them into light energy to create a fascinating ever-changing show. 2-channel; plugs right into any electrical outlet . . . no hookup to speakers! 8" unbreakable polypropylene white translucent sphere on futuristic 4" dia. base. Solid state circuitry; two 40w bulbs (red & yellow). **No. 71,575 $13.95 Ppd.**



Budget-Priced Versatile Spotlight

500-watt theatrical effect spotlight without theatrical prices; continuous adjustable spot size (at 15-ft. throw, 4" to 8-ft. dia.) sharply defined cone of light . . . ideal for clubs, theatre groups, schools, etc. And perfect for use with Mirrored Balls. Adaptable to various mountings, or use with its own large base mount. Includes directions for adding simple plastic sheet filters for color spots. This budget spotlight is our Visual Effects Projector with adjustable diaphragm, universal bracket, and stand. Can be used for other projection purposes. **No. 71,505 $69.00 Ppd.**



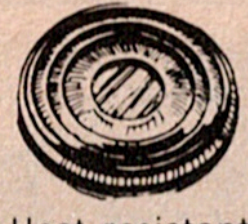
Clock Crystals For Wet Shows . . . 2 Sizes

Ideal project-thru containers for solutions & mixtures. Place 1 on overhead projector, add solutions & you're set! Concave shape; clear glass; 1/8" thk.; 1" deep.

14-7/16" dia. Clock Crystal **No. 71,187 $2.25 Ppd.**
16-1/16" dia. Clock Crystal **No. 71,188 $2.75 Ppd.**

First Quality Glass Fresnel Lenses

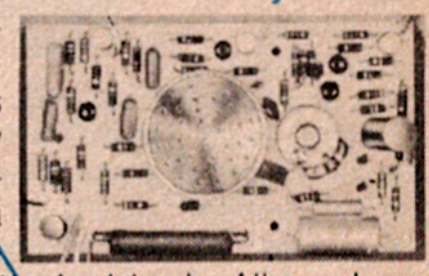
For spotlights & recessed lighting.



No.	Dia.	F.L.	Price
80,018	3"	3"	$2.75
80,019	4½	4¼	3.10
80,021*	6	3½	4.65
80,022*	8	4½	6.75

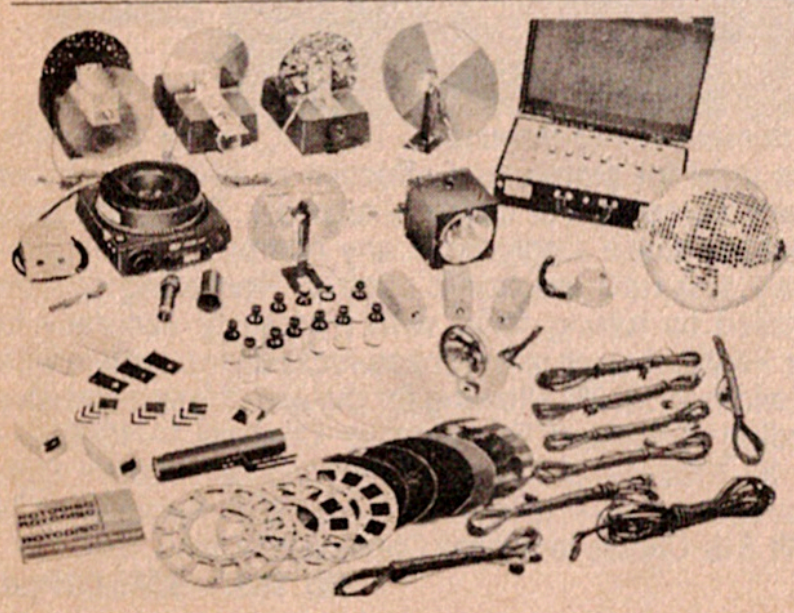
(*) Heat resistant. May be used with large wattage bulbs.

Sensational Color Organ Value . . . Only $4.95



A recent purchase of a manufacturer's production overrun allows us to offer this surplus bargain . . . a truly inexpensive yet sensitive 3-channel color organ. It's a fully assembled printed circuit board (3½ x 5¼") and attached leads. All you have to add is 3 colored bulbs (110v), a 110v AC line cord, and some kind of case. Features a completely solid-state circuit with a built in crystal mike for audio input. Each channel delivers up to 500 watts of power which is enough to make any room in your home a festival of sight & sound. Incl. instr. Seems ideal for making a lamp that responds to sound in 3 colors. May vary slightly from illustration. **No. 41,985 $4.95 Ppd.**

SOLD OUT



Complete Light Show . . . Portable . . . Quick Set Up

Everything needed for a professional light show. Features modularized Mini-Console for remote control of visual effects, projector & other lighting equipment. Also includes Model 750 Carousel® Projector & lens; 3 Professional Visual Effect Projectors; 12" mirrored ball; spotlight; motorized color wheel; (2) kaleidoscope lenses; 2 psychedelic wheels; 2 hexidoscopes; 2 colored window wheels; 2 colored cloud accessories; (3) 1 rpm motors; 3 bracket sets; rippling color accessory; striped wheel; lenticular wheel; musical note wheel; 4 blank wheels; transparent paints; 2 Beck slide sets; polarized slides; polarized spinner; strobe; 3 power control boxes; projector control box; (14) 25-ft. power cables; (2) 25-ft. projector cables; and instr. Shipping wt. approx. 175 lb. **No. 85,210 $990.00 F.O.B. Barrington, N.J.**
For more information write for Bulletin No. 9893.

AUDIO VISUAL

Stereo Tape-Slide Synchronizer

Provides Automatic Coordination between Taped Narration & Sound Effects and Your Slides

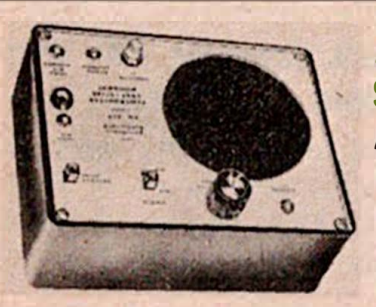
Amateur Photographers: Add professional touch to home slide shows; add "at-the-scene" taped sounds and/or your commentary. **Teachers:** Present annual lectures or set up (once & for all) difficult or time-consuming yearly experiments. **Businessmen:** Set up point-of-purchase displays. **Salesmen:** Give your "pitch" and show your products without fear of leaving something out. **Industrialists:** Train workers in step-by-step assembly procedures. **Anybody and Everybody:** The uses of the Tape-Slide Synchronizer (TSS) are unlimited. All you need is: a 35mm projector with a remote control slide changer; a stereo-type tape recorder; standard audio cables. Synchronized sound & sight slide shows are easy to prepare . . . easier to present. In sturdy plastic case, approx. 4 x 3 x 1½", powered by 9v transistor radio battery (not incl.). Comes with instructions for attaching unit to your projector and recorder.

No. 41,222 $23.95 Ppd.

6-Ft. Connector Cords

6-ft. rubber-covered cords connect TSS above with slide projectors. Phono plug at one end fits TSS and 5-prong plug at other end fits projector.

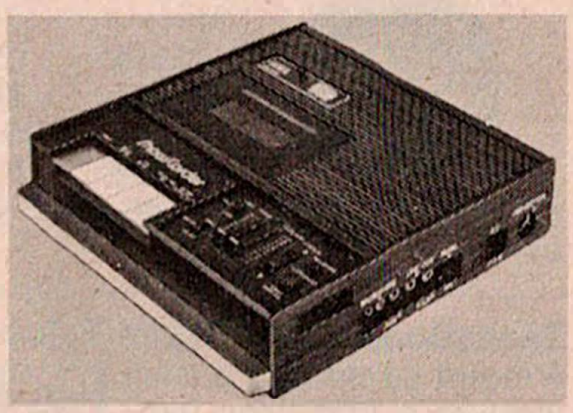
For Kodak Projectors. No. 60,804 $4.50 Ppd.
For Airequipt Projectors. No. 60,805 $4.50 Ppd.



Monaural Tape-Slide Synchronizer

Automate slide shows with a MONAURAL tape recorder (cassette or reel-to-reel). Similar to above TSS, but designed for use with low-priced recorders & any remotely controllable slide or film-strip projector (with low-voltage AC slide change control circuits). Uses 50 Hz control tone; built-in monitoring loudspeaker. Connecting cord for tape recorder & instr. incl. 2¼ x 5¼ x 7" plastic & metal case. Projector connecting cords above required. **No. 71,701 $54.95 Ppd.**

1 Unit Records & Synchronizes Sound & Slides



Ideal for sales meetings, trade shows, lectures and home shows. Even use as a regular cassette recorder. Features: unique controls to focus and activate forward & reverse cycles on projector from Show/Corder; counter for indexing purposes; record & erase sound or signal from tape separately; monitor switch to hear music & narration at same time; 10 level sliding volume control; and operates on AC or DC. Includes: connecting cable for Kodak Carousel® projector; direct recording (radio—hi-fi) patch cord; AC power cord; earphone; remote microphone with stand; blank cassette; 4 "C" batteries; and instr. Overall size: 9 x 8-7/8 x 2-7/8"; wt. about 5¼ lb. (Expand your Show Corder's audio range for larger audiences with Speaker-Amp & P.A. System below.)

No. 71,619 $181.50 Ppd.

The New Speaker-Amp

● Speaker ● Amplifier ● Pre-Amp ● Makes Show Corder a P.A. System!

A unique combo of speaker, amplifier & pre-amp in a compact portable unit. Perfect for use at demonstrations, lectures & sales meetings. Use with all standard 8 ohm audio equipment for amplified sound capable of filling large meeting rooms or use as an independent public address system. Simply plug standard microphone (incl. with Show Corder above) into Speaker-Amp. It has its own separate volume control. Storage area in cabinet. Extra long, 50-ft. connecting cord, 12-ft. AC cord & instr. incl. Attractive black case: 8 x 10½ x 12"; 8" full range speaker. Output max.: 7w (5w @ 10% distortion). Wt. 10 lb.

No. 1638 $72.00 Ppd.

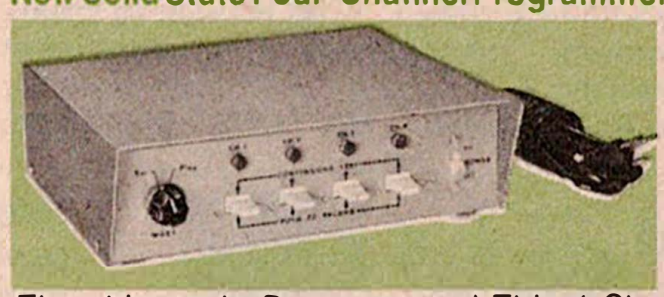
Deluxe Three-Channel Programmer . . . For Light Shows And Other Multimedia Presentations

Provides Automatic Coordination between Taped Narration & Sound Effects and Your Slides

The deluxe 3-Channel Programmer allows 3 slide projectors to be operated by and in close synchronization with an audio program recorded on magnetic tape. Any stereo tape recorder (reel-to-reel or cassette type) can be used to prepare a synchronized 3 projector multimedia presentation. The programmer both encodes projector slide change commands when an automated multi-media presentation is created, and also decodes these commands and operates the projectors when the program is presented. (Designed for use with 3 Kodak Carousel® projectors.) Programmer operates from tape-recorder-supplied signals as low as 100 millivolts. Input level adjustment provided, as well as: individual controls for initially setting the record level of the 3 control tones; both low and high level outputs so unit can be connected to either recorder's "mike" or "line" inputs; on and off switch with power lights; and a record, playback, mode selector. Solid state electronics. 120v AC. Includes 3 synchronization cords and instr. Approx. 3¼ x 5½ x 8½". Wt. 2 lb. 14 oz. **No. 71,531 $210.00 Ppd.**

Accessory Relay With Built-In Transformer—turn on or off any 120v AC device. **No. 71,700 $60.95 Ppd.**

New Solid State Four-Channel Programmer . . .

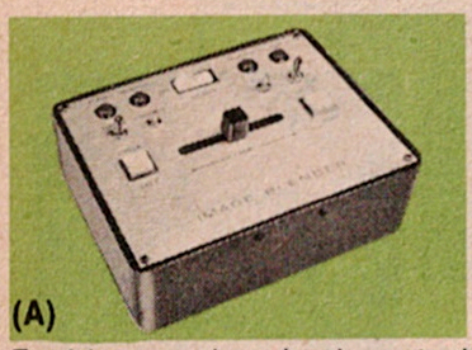


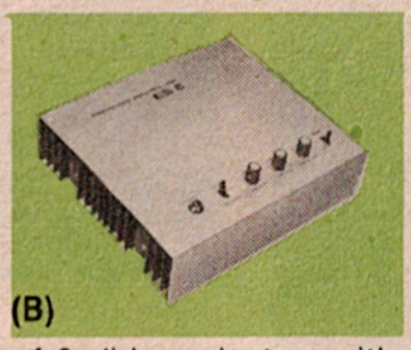
Expandable to 8 and 12 Channels!

The ultimate in Programmers! This 4-Channel Programmer is ideal for simple and effective multi-media shows with any stereo tape or cassette recorder. The 4 channels are easy to pulse singly or in any combination simultaneously. Has new electronic control! Recording section controlled by tuning forks with frequency accuracy to ±1Hz. Playback uses latest phase-locked loop system with band width of ±2.0% allowing for the use of less expensive recording equipment. Frequencies: Channel 1—1200; 2—1500; 3—1900; 4—2300. Input from recorder: 100mV. Output to recorder: 10—100mV. 3¼ x 5½ x 8½". Requires 117v AC. Wt. 5 lb. Cables for Kodak Carousels® & instr. incl.

No. 1637 $345.00 Ppd.

Dissolve Units For Light Shows and Audio Visual Presentations


(A)

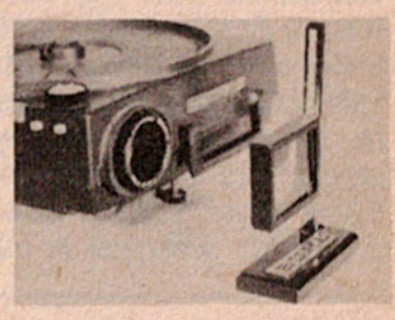

(B)

Enables synchronized control of 2 slide projectors with dramatic fade in and out. Show professional dissolving-scene presentations! Eliminate eye-fatiguing black-outs as one scene dissolves into another! Both 110-125v; 60Hz. Cords and instr. incl.

(A) Manually-operated Unit. Professional touch without expensive equipment. Projected light level remains constant. Designed & equipped to operate with Kodak Carousel® and Ektagraphic® slide projectors (incl. custom series). 2 projectors and this unit permit continuous presentations of up to 280 slides without magazine change. Solid state circuitry for dependability and silent operation. Sturdy case with anodized aluminum operator panel (3 x 5¼ x 6¾"). **No. 71,567 $81.50 Ppd.**

(B) Deluxe Dissove Unit. For use with 2 Kodak Ektagraphic® slide projectors. Provides adjustable "up" and "down" dimming rates (1 to approx. 10 sec.). Self-contained adjustable interval timer (3.5-15 sec.). Accepts standard Kodak remote hand control and external synchronizer units. "Line up" switch to light up both projectors for easy projector postitioning; focus switch to adjust focus of "on" projector; dissolve button. 2¾ x 8¾ x 9½". **No. 71,563 $249.50 Ppd.**

Enlarge Projection Of Movies And Slides With The Image Amplifier

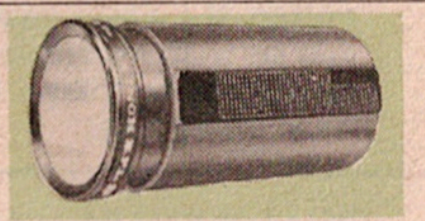


This attractively mounted, free standing optical element is ideal for enlarging the image of 8mm, Super 8, and slide projectors. Double the size of the image or reduce the projection distance while keeping the same image size. Simply place the unit in front of the projector wherever space might be limited or when you desire larger than normal picture sizes such as in homes, meeting rooms, study modules, libraries, etc. Compact size (4 x 1¾ x 6½") permits easy storage and travel. Works well on rear projection screens too. Adjusts from 1-6½". *Price includes postage.) **No. 71,827 $22.95 Ppd.***

Automatic Repeating Cassette

This automatic, endless repeating unit records and plays back on any stereo or mono cassette recorder—no special equipment necessary. Its 20 min. message automatically repeats with true fidelity. Ideal for background music, sleep inducing, repeating sales displays (incl. slide presentations), learning—wherever faultless reproduction, repetition and fine fidelity are required. Amazing sound quality due to exclusive microcron lubricated tape . . . no perceptive sound quality difference after 1,000's of hours use. Has plastic storage container and instructions **No. 60,920 $10.25 Ppd.**

Biggest Images at Shortest Distance

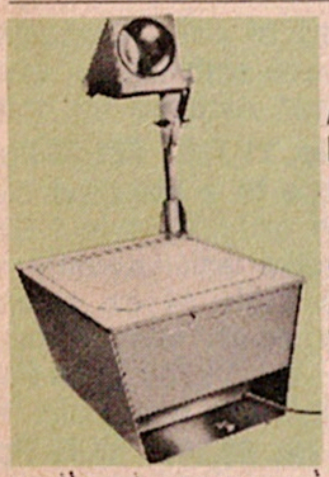


Special Lenses Designed For Carousel® Projectors

Solve those impossible slide projection problems. These American-made Buhl short-throw lenses permit slide presentations with your Carousel® unit in even the smallest areas; ideal for rear projection display units. Get a big image in a very short distance. **Each: $81.00 Ppd.**

Image Width	Lens to Screen (A)	(B)
12"	19"	24"
24"	32"	41"
60"	71"	92"
90"	104"	11.2"
10.0'	11.3'	14.8'

(A). 1.4" F.L.; f/3.0. Standard workhorse! **No. 1930.**
(B). 2.0" F.L.; f/3.5. Optimum for moderate wide angle and economy; covers super slides. **No. 1931**



Bright, High Resolution 10 x 10" Overhead Projector

A quality projector with a unique balanced Fresnel lens and objective lens system providing superior resolution and uniform lighting over the total screen area. An image evaluation system lets you elevate image without light loss or picture quality. Exclusive Polar-cushion cooling system keeps 10 x 10" stage pleasant to touch, protecting transparencies, even after hours of continuous use. Features sharp rack & pinion focusing, hinged Fresnel holder, compact head, and holes for roll attachment. 14 F.L.; range 5-25 ft. Wt. 21 lb. Size: 15-5/8 x 13-3/8 x 24", gold finish. **No. 80,201 $149.95 Ppd.**
Replacement Lamp **No. 42,081 $ 9.95 Ppd.**

The FM Wireless Microphone . . . makes any FM radio a P.A. system

- **Lightweight • Low-cost**
- **Battery powered**

Completely portable, the FM Wireless Microphone is a simple practical way to turn *any* FM radio (operates on any open frequency) into a powerful, quality portable P.A. system. Operates well indoors or out (effective as far as 100-ft. away when FM receiver is equipped with AFC) . . . making an ideal communication device for shows, meetings, rallies, banquets, small theatres & gyms. A real "voice saver" for teachers with large classes! Great for churches & other locations where long runs of cable are unsightly, inconvenient or dangerous. Since it's wireless, it offers speakers unlimited convenience & freedom to move about (equipped with soft antenna & tuning wand). A highly stable oscillator minimizes system drift. Dimensions: 1-1/16 x 1-3/16 x 7-9/32". Wt. 6 oz. Transmitter frequency: 88 to 108 MHz. Frequency tolerance: ±50KHz. Field strength: 34db @ 50-ft. Mirophone type: dynamic. 200 ohms impedance. Sensitivity: 8db ±3db. Requires 9v battery (not incl.) . . . battery life approx. 150 hr. **No. 60,995 $29.95 Ppd.**

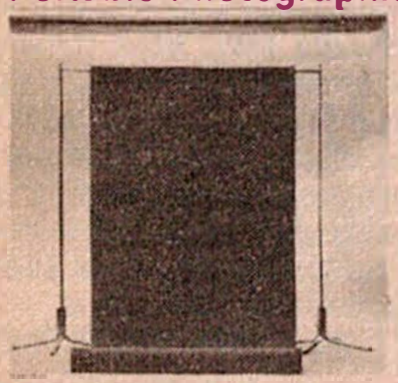
Rear Projection Screen

Excellent low-cost rear projection screen made of 15¼ x 15-7/8 x 1/8" thick plexiglass. Other typical applications are lighting diffusers, art objects, sun screens, decorative glazing. **No. 71,831 $4.50 Ppd.**

Trick and Special Effects PHOTOGRAPHY KIT

With this kit you can produce all sorts of weird, wild, wonderful, and way-out photo effects. Turn Einstein into a Frankenstein (with the pliable plastic "lens"), make a two-headed anything (it's all done with mirrors), kaleidoscope your friends into immortality or drive them to "diffraction", make psychedelic slides or impressionistic photo art (using the patterned glass), turn twinkling night scenes into spectral fantasies (with the diffraction gratings) or make a family scrapbook friends will ask **you** to let them see. In general, turn your photographic work into Coney Island or the Louvre! Here's what you get: three 5 x 7" pieces of patterned glass; two front surface kaleidoscope mirrors; a 5 x 7" front surface mirror; a 5 x 7" piece of clear plastic; a+3 diopter close-up lens, series VI; a linear diffraction grating; four 2" square, metal pattern slides; and instructions. All you need is a camera and a creative mind. The rest is easy. **No. 71,229 $13.25 Ppd.**

Portable Photographic Background Stand



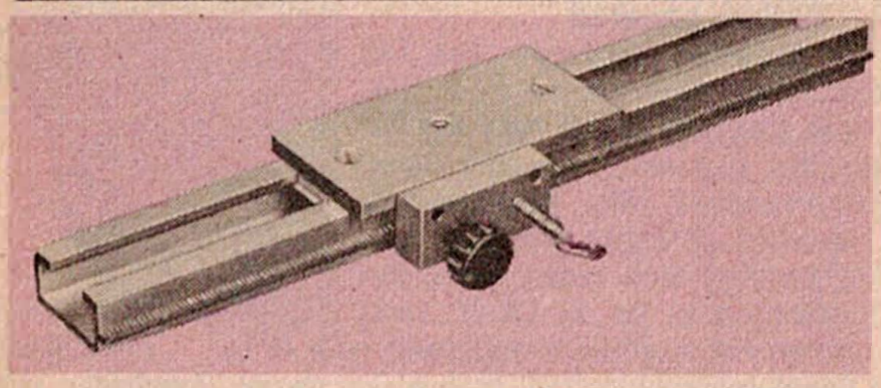
Great for large backdrops, group shots, large items. Has 2 all-metal, adjustable upright side-poles (68-120" high) and one adjustable crossbar (62-115" wide) to support Seamless Photo Paper Rolls (see right). Each side-pole individually self-standing and readily holds photo lights too. Disassembles easily . . . light enough for complete portability. Together with Paper Rolls, turn an entire wall into a seamless projection screen (white recommended). **No. 71,255 $41.50 Ppd.**

Big, Seamless Photo Backdrop Paper

Covers almost 9 x 36 feet of wall, floor or ceiling. Turn any background area into a clutterfree, non-distractive, clean expanse of paper backdrop for group portraits, large appliance shots, etc. Use for temporary murals, window displays, posters, school projects. Available in 3 colors, 107" wide x 12 yards per roll. Shipping wt. 12-lb. White **No. 85,191;** Pastel Blue **No. 85,193;** Opaque Black (for window blackout)

No. 85,192 Each roll $10.95 T.C.C.*

*Note: Shipped "collect" via Railway Express from Barrington, N.J. Check your local Express office for cost (it may be to your advantage to order up to 4 rolls for the same shipping charge. Specify "Photographic Material" for cheapest rate.)



Versatile Rack And Pinion Units
For Photographers, Lab Men, Hobbyists

Excellent focusing device for photomacrography. Smooth running rack and pinion assembly has 2 x 4" sliding platform for holding any equipment requiring fine linear movement. Platform has through-hole for mounting camera; instructions included for mounting cameras, lights, lens holders, etc. Thumbscrew locks platform in position by forcing nylon friction stop against track; tension plate below platform allows positive lock.

Turn knob with pinion to drive platform smoothly along either 12" or 24" track with full length rack. Tracks (sold separately) have holes for mounting complete assembly, or you can drill & tap track for tripod use. Heavy-duty tracks & platform of noncorrosive aluminum. Slide Platform only (w/knob & pinion, thumbscrew lock & tension plate). **No. 40,891 $12.00 Ppd.**
12"—long Track only. **No. 60,572 $13.75 Ppd.**
24"—long Track only. **No. 60,573 $21.75 Ppd.**

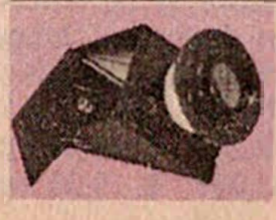
Color And B&W Prints At The Press Of A Button!

Eliminates: filters for printing from slides; temp. controls; mixing/storing chemicals; bulky trays. Develop prints of any size! Shelf life 2 yrs. regardless of previous use.

Color Processing Kit. Easily process color prints from negatives in 3 steps; transparencies in 4. Good for Ektachrome, Ektacolor, and GAF print papers. Develops approx. 60 8x10's. Aerosol cans (20 oz. ea.) of color developer, hardener/fixer/stabilizer, and bleach stabilizer, & instr. incl. Note: B&W Developer (below) required for color prints from transparencies. **No. 71,735 $31.25 Ppd.**

B&W Processing Kit. 3 easy steps to a beautiful b&w print from a negative! Wash only 15 min.! Use w/photosenitizing solution to make enlargements on glass, etc. Develops approx. 175 4x5's. 14 oz. aerosol can of developer, 16 oz. of fixer; power unit; refillable spraymaker; & instr. incl. **No. 71,734 $9.50 Ppd.**

B&W Spray Print Developer (only). Use with Color Kit or as B&W Kit refill. 14 oz. **No. 60,949 $6.75 Ppd.**

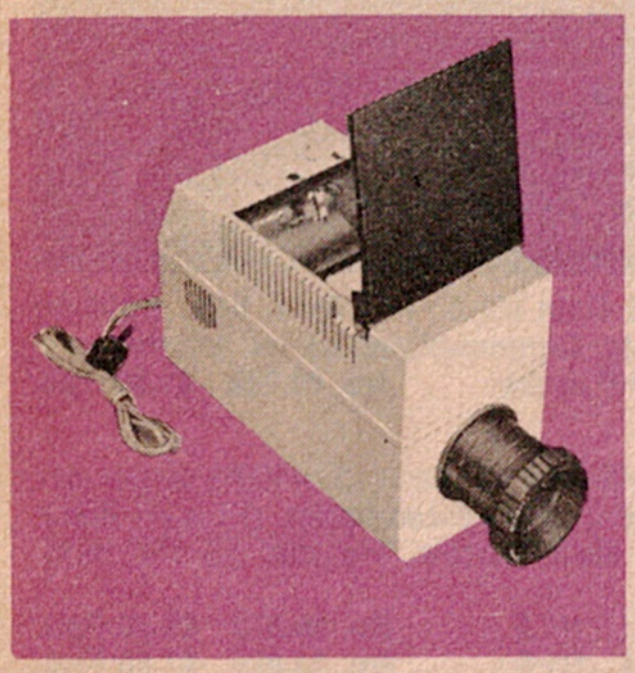


Copy/Process Lens

13" F.L. coated optics, adjustable aperture F10 to F/90, with mounting flange and 3 x 4" image reversal mirror attached. **No. 71,767 $30.00 Ppd.**

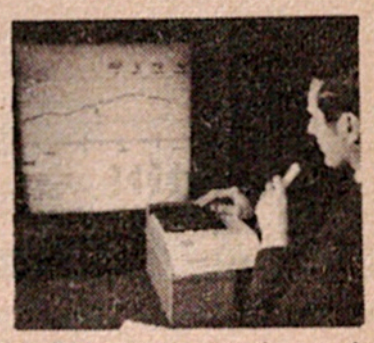
VISUAL-EFFECT PROJECTORS, SEE PAGE 106 & 107.

Price Breakthrough on Quality Opaque Projector



Best Projector Of Its Kind Under $200.00

Only $115.00



This Opaque Projector, imported from W. Germany, projects photographs, color prints, diagrams, drawings, blueprints, paintings, watercolors, maps, portions of pages from books, coins, stamps, and other objects (up to 5 x 5) . . . in black and white or color. Artists use it to project postcard scenes for painting dimensions. It projects a clear, bright, and brilliant image, enlarged up to 54x54 from a distance of 8 feet in a darkened room.

The copy is easily put on projector's topside glass stage and held flat by the removable magnetic platen. Flat stage lets you use the projector upside down to project parts of large maps, etc. Has 3-watt light that lights only when you are putting copy in the projector—ends fumbling in a darkened room.

Maximum brightness and entire field focus are obtained because of: the high speed, 200mm, anastigmatic (flat field) projection lens (f/3.5, 8" F.L.); the peanut-sized, 150-watt, quartz halogen lamp (approx. 50 hr. life) that outshines oversize projection lamps; the well-designed internal reflecting system. Easy to focus, just turn lens. Quiet, powerful, turbo-blower keeps projector running cool, so as not to damage valuable prints. High-impact gray plastic case, 8¾ x 6 x 12½". Wt. 11 lb. 8 oz. 5½-ft. cord. Uses 110v AC. Quite a value. Best we've seen under $200.00.

No. 71,272 $129.00 Ppd.

Extra Lamp **No. 41,374 $6.50 Ppd.**

Black-grained vinyl carrying case for easy movement and projector protection. **No. 71,444 $11.95 Ppd.**

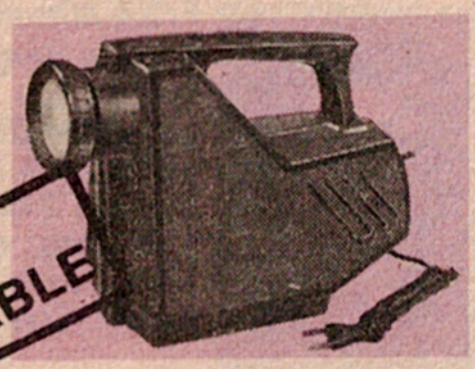
Double Your Projection Distance with a Long Focus Lens. Allows you to project a clear, bright image from a distance of 17 ft. in a darkened room. Instr. incl.

No. 41,686 $4.95 Ppd.

Toy Opaque Projector . . Lots Of Fun . . Only $8.75

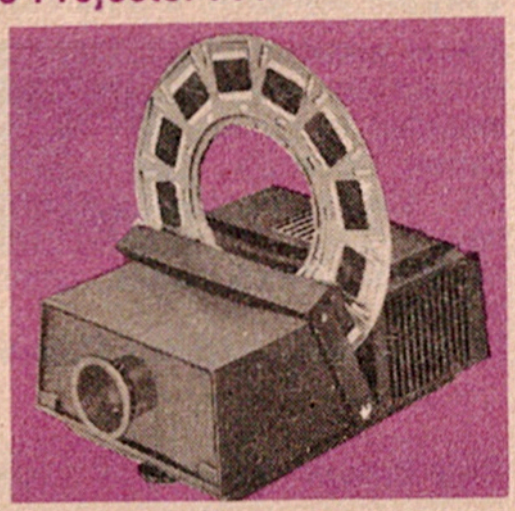
Enlarges Color and B&W Copy Up to 3 x 3½"

Fascinates Youngsters



Projects and enlarges any opaque copy without using film or negatives. An ideal low-cost item. Provides hours of amusement and fun for children. Projects pictures from magazines, comics, coloring books, etc. Any opaque drawing can be projected, provided the unit is used in a darkened room. Black plastic case with carrying handle. Operates on 115v, AC. Uses standard 60-watt bulb (not incl.). 6-ft. cord. 12 x 8 x 4½". Wt. 1 lb. 12 oz. **No. 70,199 Only $8.75 Ppd.**

35mm 500-Watt Slide Projector . . .



Large Screen Images

A $39.50 Value

Only $25.00 Ppd.

Has a rotary magazine that holds 12 Instamatic or 35mm slides. Slides immediately visible and quickly positioned and changed. High-resolution, 3" F.L., f/3.5 coated an astigmat lens is distortion free. Gives much larger screen image at shorter projection distances than standard 4 or 5" F.L. lenses . . . ideal for half-frame slides. Condensing system provides even illumination. Sturdy, high-impact polystyrene case, 4¾ x 7 7/8 x 10¾", with lift-up handle. Metal base has height adjustment-knob and rubber feet. Slide disc; detachable 8-ft. cord and plug; and instr. incl. **No. 71,001 $25.00 Ppd.**

Replacement Lamp **No. 41,154 $5.65 Ppd.**

12 Slide Discs **No. P-70,992 $4.75 Ppd.**

Two Do-It-Yourself" Books

"How to Build Slide Projectors" Edmund & Brown

A complete manual in 20 pages covering the optics and construction of 35mm slide projectors. Plans include several inexpensive utility designs, micro projection, rear projection, and overhead slide projector. This book gives you all the information you need to build your own instruments **No. 9014 50¢ Ppd.**

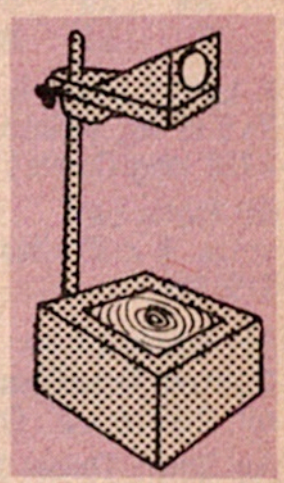
"How To Build Opaque Projectors"

Detailed designs for 8 different projectors, each to meet a specific need, whether visual use or drawing. Covers theory of projector optics, optical layouts, lighting system, etc. Construction plans incl. 18 pp; 8½ x 11".

No. 9314 50¢ Ppd.

Construct A Big 10 x 10" Overhead Projector . .

For Less Than $40.00



Why pay $150.00 for one? Build your own with Edmund's Overhead Projector Optics Kit. The secret lies in selecting right optics. Edmund's kit contains these matched elements: double Fresnel condenser (plastic) 11 3/16" square; 5½" F.L.; two 88mm dia. meniscus lenses, 14" E.F.L., f/3.5; instructions.

No. 70,966 $12.00 Ppd.

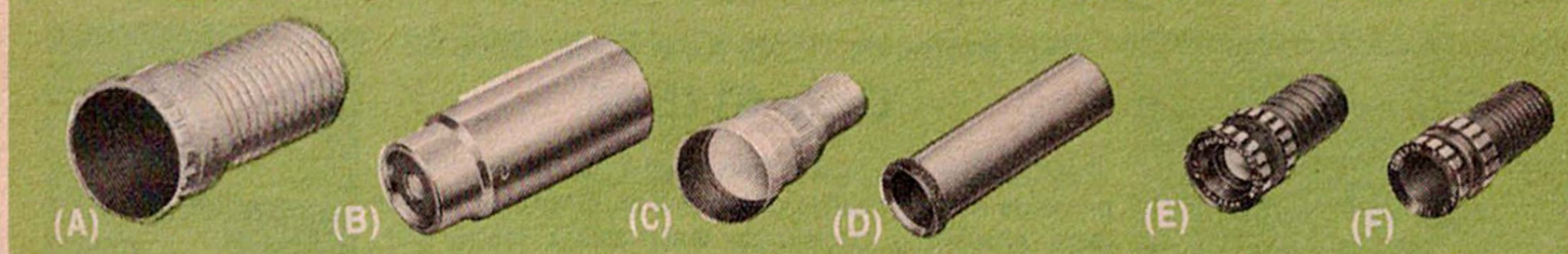
To complete your projector, you will also need scrap lumber, wire, motor & fan, plus these following low-cost Edmund items:

500-watt quartz iodine lamp.	**No. 40,779**	**$8.50 Ppd.**
Socket for above.	**No. 40,781**	**$1.50 Ppd.**
4 x 6" mirror	**No. 60,247**	**.65 Ppd.**
Switch.	**No. 75**	**.35 Ppd.**
Reflector.	**No. 566**	**.75 Ppd.**
Motor & 6" Fan.	**No. 60,689**	**$5.95 Ppd.**

"Ultraviolet and Fluorescence Photography"

Describes a wide variety of applications. Pprbk; 8½ x 11"; 36 pages. **No. 9102 $1.00 Ppd.**

BARGAINS IN SURPLUS 8MM MOVIE PROJECTION LENSES



(A) Wide Angle 19mm F.L. f/1.6 33⅓% wider screen image than standard ¾" F.L. 4-element coated system in 7/8" O.D. alum. barrel with spiral focusing threads. Approx. 2 11/16" long. Fits most 8mm projectors.
No. 40,727 $3.50 Ppd.

Wide Angle 19mm F.L. f/1.6 Not illus. Better than above. For Super 8 too. Black barrel, 1 3/8" long, ¾" O.D. Must be sleeved to use with projectors accepting 7/8" O.D. barrels. **No. 41,132 $4.00 Ppd.**

(B) Wide Angle 7mm F.L. f/2.7. Fine 6-element lens fills 30 x 40" screen with sharp image at 3½-ft. 3 adjusting screws center lens system in alum. barrel 2" long, 7/8" O.D. fits proj. with 7/8" O.D. lens barrels; adapts to larger dia. by using sleeve. **No. 40,777 $4.00 Ppd.**
As above, but with 2 metal adapters to fit any barrel of 7/8", 15/16", or 1" dia. **No. 40,589 $6.25 Ppd.**

(C) Dual Wide Angle And Normal System 17mm And 25.4mm F.L., f/1.6. Revere lens gives extra sharp pictures 25% larger than normal. Unscrew wide angle unit for normal size pictures. Fits projectors with ¾" O.D. lens barrel. 3 3/16" long. Front dia. 1 5/16". Spiral grooved barrel 1 5/16" long. **No. 60,194 $4.50 Ppd.**

(D) Low-Cost 25.4mm f/2.5. For 8mm film, lighting photo subjects, etc. Chrome-plated barrel, knurled cap, 2 3/16" long, 11/16" in dia. **No. 40,266 $1.50 Ppd.**

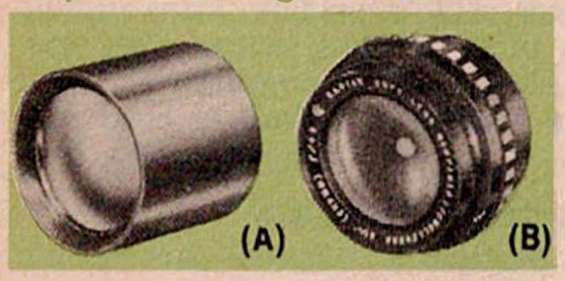
(E) (F) Quality Z-O-O-M Lenses. 33⅓-100% larger pix without moving. Hi quality coated optics. (E) & (F) Black & silver threaded alum. barrels, 7/8" dia. (E) 1½" long. (F) 1 11/16" long.
(E) 13 to 25mm F.L., f/1.5 **No. 40,873 $8.50 Ppd.**
(F) 19 to 25mm F.L., f/1.6 **No. 40,874 $7.50 Ppd.**

PROJECTION TABLE

Item	No.	Diagonal at: 10 ft.	16ft.	25 ft.
(A)	40,727	2'6"	4'	6'3"
(B)	40,777	6'8"	10'8"	21'
(C)	60,194 (25.4mm F.L.)	1'10"	3'	4'8"
	(17mm F.L.)	2'9"	4'9"	7'2"
(D)	40,266	1'10"	3'	4'8"
(E)	40,873 (25mm F.L.)	1'10"	3'	4'8"
	(13mm F.L.)	3'8"	6'	9'4"
(F)	40,874 (25mm F.L.)	1'10"	3'	4'8"
	(19mmF.L.)	2'6"	4'	6'3"

FINE QUALITY LENSES FOR PROJECTORS AND VIEWERS

Surplus, Anastigmat Lenses



For enlarging, projecting, overhead & opaque proj. All coated precision optics. Black anodized metal barrels; used; good cond.

	Pix F.L.	f/No.	Coverage	O.D. x Length	Stock No.	Price Ppd.
	8"	4.5	6 x 6"	2.75 x 2.75"	41,432	$19.50
(A)	5¾	5.6	3¼ x 4¼"	2 x 1¾"	41,273	15.00
	7-4/5	7	5 x 5"	2½ x 2-3/8"	60,695	15.00
	8¼"	5.6	6½ x 6½"	2-1/16 x 2-1/8"	41,135	18.00
	9"	5.6	6 x 6"	2¾ x 3"	60,719	19.50

F. L. 8¼": similar to above but with iris diaphragm (5 click stop f/4.5 to 16); 0.85mm metric-threaded barrel (2.622" thread pitch) 2.718" long. Covers 6" sq. copy. **No. 60,723 $40.00 Ppd.**

(B) Raptar Lens . . . limited quantity 8¼" F. L.; f/4.5 to 32 click stops. 6 x 6" coverage. 2.52 O.D. x 1.975" long. Originally $150.00! **No. 41,484 $29.50 Ppd.**

For Long-Throw 35mm Projectors: 125mm F.L.; f/3.5

Coated Anastigmat. Covers 2¼ x 2¼" slides. Thrd. barrel: 2-9/16 x 2". Overall 3-9/16". **No. 60,402 $9.50 Ppd.**

For Short-Throw 35mm Projectors & Viewers

Mounted Cooke Triplets. Flat field; fine image quality. Not readily affected by heat. Black anodized aluminum.
For Half Frame 35mm Slides. 58mm F.L., f/3.0. 1-7/8 x 1.243" dia. Coated. **No. 41,142 $6.25 Ppd.**
For Half Frame 35mm Slides. 35mm F.L. f/3.5 17/32 x 39/64" dia. **No. 40,524 $5.25 Ppd.**
Coated Mounted Anastigmat 3" F.L., f/3.5. Replacement lens for Visual Effect and Polarized Color Projectors. 1-7/8 O.D. x 4". For short throw projection, super slides, Instamatics, etc. **No. 60,753 $6.00 Ppd.**
For 2¼ x 2¼". 75mm F.L., f/4.5. ¾ x 29/32" dia. **No. 40,522 $7.25 Ppd.**

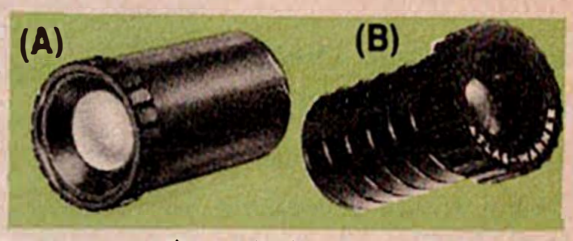
F/3.4,40mm F.L. Projection Lens

Surplus Bargain! 6-element flat field lens system in brass barrel. Build a projector or viewer (covers Instamatic film & smaller). Original magnification 24X at 40" (slide-screen). 1.61" long; dia.: large, 1.604", small 1¼". Remove diaphragm for f/1.4 system. Coated.
No. 41,379 $4.50 Ppd.

Copy Lens & Reversing Prism . . . 17" F. L.

Top quality and resolution. Iris diaphragm with 7 click stops (f/10 to 60). Bayonet base lens demounts easily from 3" right-angle prism. Case. Used but in good shape. **No. 71,278 $100.00 Ppd.**

Surplus Bargain! 4" F.L. Projection Lenses



35mm anastigmat projection lenses mounted in plastic barrels. Cover 2¼ x 2¼" slides. Both have 2" O.D.
(A) f/3.5. Coated lenses; unthreaded; overall length: 3-13/32". **No. 41,713 $2.95 Ppd.**
(B) f/4.5. Spiral threaded. Overall length: 3-11/16". **No. 41,676 $3.00 Ppd.**

Free Bulletin: No. 9880 for surplus Copy Proj. Lenses.

8" F.L., f/3.5 Anastigmat Lens

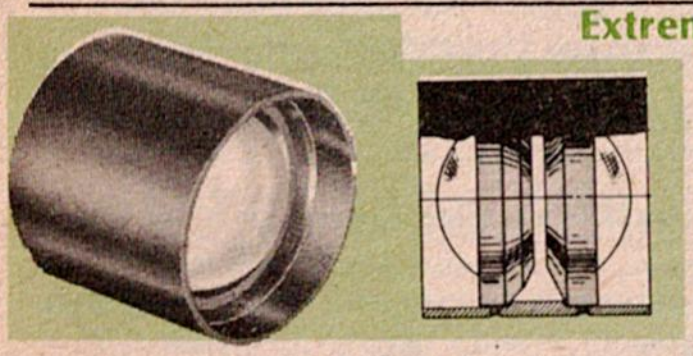
High quality projection and copying lens. Cooke's triplet with 8" F.L. f/3.5. Mounted in black metal barrel, 2 15/16" long with 2.245" dia. Coated optics. Gives flat field and long throw on 35mm projectors. Useful for enlargers with diaphragms and for overhead or opaque projectors (up to 6 x 6"). Lens cap incl. **No. 60,624 $64.00 Ppd.**

Low-Cost Close-Up Lenses For Series V, VI, or VII Filter Holders

Take pictures of pictures, insects, flowers, etc. with close-up lenses that fit either Series V (30mm dia.), Series VI (41mm dia.), or Series VII (51mm dia.) filter holders. Best with single lens reflex cameras, but may be used with other types also. Can be used singly or together (for increased magnification). Require no exposure compensation and do not affect operation of automatic diaphragms. Instr. incl.

Diopter	Focuses to	Series V	Ppd.	Series VI	Ppd.	Series VII	Ppd.
Plus 1	38"-20"	**94,639**	**$1.60**	**94,645**	**$2.40**	**94,730**	**$3.50**
Plus 2	20"-13"	**94,640**	**1.60**	**94,646**	**2.40**	**94,731**	**3.50**
Plus 3	13"-10"	**94,641**	**1.60**	**94,647**	**2.40**	**94,732**	**3.50**
Plus 4	10"-7"	**94,642**	**1.60**	**94,648**	**2.40**	**94,733**	**3.50**
Plus 6	5½"	**94,643**	**1.60**	**94,649**	**2.50**	**94,734**	**4.25**
Plus 10	3½"	**94,644**	**1.60**	**94,650**	**2.50**	**94,735**	**4.65**
	Set of all 6:	**P-40,930**	**$9.00**	**P-40,931**	**$13.95**	**P-41,337**	**$22.75**

Extreme Wide Angle Metrogon Lens—Giant 8½ x 11" Coverage



Completely Sold Out Previously; Now, more at the same low price! A terrific buy for anyone interested in building their own photographic equipment! You can build an Opaque Projector for 8½ x 11" copy, with 5 magnifications at only 3 ft., that would cost you up to $600 retail. We mounted the coated f/3.5, 6" F.L. Metrogon Lens from a government aerial camera in a black metal barrel 2.4" long (2-9/16" O.D.). This 4-element, symmetrical system will give you large pictures at very short "lens to screen" distances. Excellent correction for flatness of field over an amazing angle of 90°. Tops for photomural work, since you can get 100" pictures or larger. **No. 60,305 $58.25 Ppd.**

Projection Lamps Tru-Focus, DFA Type w/built-in reflector for brighter pictures. 150w, 115v lamp, 1½" dia. x 3-9/16", with special mounting socket. Approx. 15 hr. life. **No. 50,189 $7.75 Ppd.**

Small-Filament, High Intensity for projectors, enlargers, viewers, etc.

100W., T-8108 DC. Bayonet	**No. 726**	**$2.25 Ppd.**
100W., DJR	**No. 41,611**	**2.95 Ppd.**
150W., FCS (24v)	**No. 41,374**	**6.50 Ppd.**
150W., T-10 SC. Bayonet	**No. 41,345**	**1.50 Ppd.**
150W., T-879DC. Bayonet	**No. 727**	**3.50 Ppd.**
200W., T-8 SC. Bayonet	**No. 41,346**	**1.65 Ppd.**
500W., T-10P Med. Prefocus	**No. 730**	**5.95 Ppd.**
500W., DAK	**No. 41,154**	**5.65 Ppd.**

Socket. DC. Bayonet Type. For No. 726 and 727 bulbs. **No. 74 35¢ Ppd.**

Socket. Medium Pre-Focus Type. For use with No. 730 bulb. **No. 82 $1.50 Ppd.**

Metal Concave Reflector. 1-3/8" dia. **No. 566 75¢ Ppd.**

Midget Louvers (3"O.D.) **No. 60,209 $1.75 Ppd.**

"Building A Condenser Enlarger"

16-page booklet filled with directions for building a fine enlarger for negatives of any size. Parts list and prices included. **No. 9038 40¢ Ppd.**

F/4.5 Anastigmat Enlarging Lens

Make your own enlargements, save money! Select a lens from popular sizes of high quality anastigmats below. Coated for increased contrast. Color corrected, flat field, excellent overall definition. Click stops on iris diaphragm. Incl. mounting retaining ring.

Stock No.	Focal Length	Coverage	Price, Ppd.
30,181	50mm	35mm	**$14.00**
30,182	90mm	2¼ x 2¼	**22.50**
50,289	105mm	2¼ x 3¼	**23.00**
30,183	135mm	3¼ x 4¼	**28.00**

Anastigmat Stereo Camera Lens System

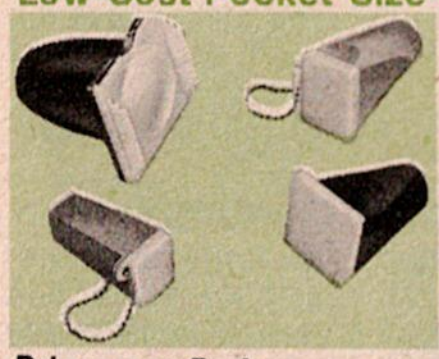
Incl. 2 F/3.5, 35mm, F.L. coated anastigmat lens systems; 2 iris diaphragms (openings F/3.5-F/22); 2 shutters, speed T. B. 2-200. Irises and shutters work together. MFX Synchromatic. **No. 41,087 $9.00 Ppd.**

Lint & Dust Remover

Fastest, easiest, safest way to remove dust & lint from lenses, negatives, delicate electronic assemblies, etc. Saves hrs. of brushing! Fluorogel permits 2,500 jet-sprays of moisture-free vapor—in any position! 70 lb. of pinpoint pressure. Aerosol can: 8 oz.; 5" extension snorkel; instr. **No. 60,902 $2.85 Ppd.**

Carton of 12 Cans **No. P-71,532 $33.50 Ppd.**

Low-Cost Pocket-Size Slide/Film Viewers



Plastic mini-viewers plus photos make unusual gifts anyone will cherish. Also great for premiums. Cut & insert a 35mm frame or mask & use an 8 or 16mm frame. Show films & slides inexpensively by having a viewer for everyone.

Prices are Ppd.

5X for 8-16mm unmtd. transparencies. 1 x 1 x 2-1/8". (12) **No. P-60,195 $2.00** (100) **No. P-70,645 $13.00**

5X for 35mm unmounted transparencies. 1 x 1½ x 2". Chain incl. Pkg. of 6 **No. P-60,220, $2.00**

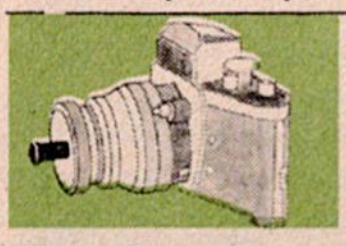
(50) **No. P-70,641 $13.50** (100) **No. P-70,642 $22.50.**

4.7X for 35 mm & 2 x 2" super slides. 2¼ x 2¼ x 2½". Pkg. of 6 **No. P-60,876 $2.50**

5X for film strips up to 35mm. 1½ x 1½ x 2". Pkg. of 6 **No. P-60,875 $2.25**

Assortment. 2 each of above **No. P-60,877 $2.50**

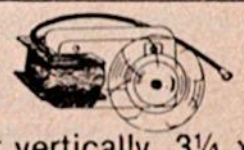
Write for special quantity prices.



Make A "Pseudo-Fish Eye" Lens

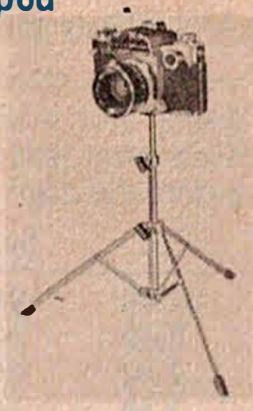
Observ-O-Scope produces almost the same extreme wide angle effect of a fish eye lens costing more than $400. Simply drill hole in correct series-size metal lens cap to fit your camera, insert rear tube of viewer and cement in place. 2¼ x ¾" dia. scope gives 175° image with normal 50mm lens. **No. 40,582 $3.30 Ppd.**

Cooling Motor With 3½" Fan Blade



Prolongs life of projector bulbs and allows you to use brighter light. Runs quietly on 110v AC. Use horizontally or vertically. 3¼ x 2¼". **No. 101 $3.95 Ppd.**

Low-Priced, Sturdy Table-Top Tripod



A sure-footed metal tripod for use in ground level, close-up and table photography. German-made with adjustable leg height and neck extension, this light-weight (12 oz.) accessory has many applications in photographing nature, portraits, business products, lab experiments, etc. Extends from 8½ to 16" high; incl. screw-on head.

No. 60,984 $6.00 Ppd.

Tilt-Top Tripod Head: Full 360° Swivel

Low-Cost. Generous-size ball & socket joint with large thumb lock. Pans to any angle . . . tilts through 180°. Standard ¼"-20 thread camera connector on 1-1/8" dia. rubber covered camera platform. 7/8" dia. ¼"-20 thread socket base. 2 x 2-1/8" high.

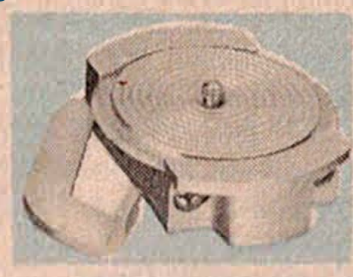
No. 41,085 $4.50 Ppd.

Low-Cost Table-Top Tripod

¼"-20 tripod thread holds standard cameras, spotting scopes, binoculars, etc. Locking ball and socket joint allows wider range of movement; locks in position. Rubber feet. 8¾" opened height.

No. 50,229 $3.00 Ppd.

Be A Camera "Quick-Change Artist" . . . Camera Adapter



Mounts on tripod as 1-7/16" dia. adapter-disc screws in camera (¼"-20 thread). Place camera on tripod, flick lever on 3" Zip Grip base, powerful spring-loaded jaws hold disc in vise-like grip.

No. 40,941 $4.95 Ppd.

Extra Adapter Disc. No. 41,113 $1.25 Ppd.

Professional Zip Grip Approx. 3¾" long for cameras 4 x 5" and larger. Use with both European and Standard ¼"-20 threads. **No. 60,692 $11.95 Ppd.**

Extra Adapter Disc. No. 41,112 $ 1.95 Ppd.

View Films And Slides In Bright Daylight

Lenscreen: new transmission - projection screen material made of light-spreading transparent microcells, permits daylight rear projection presentations. Ideal for sales meetings, conferences, lectures, classrooms, home showings. Elastic and flexible, folds and rolls with no creases. No "hot spots", resists fire and fungus, non-yellowing and unaffected by temperature & humidity. Reversible. Instr.

1 ft. x 1 ft. **No. 70,934 $3.75 Ppd.**

3 ft. x 3 ft. **No. 70,935 $25.00 Ppd.**

6 ft. wide sheets **No. 2508 $15.00** per running ft. (2 ft. min.) **Ppd.**

Rigid Rear Projection Screen

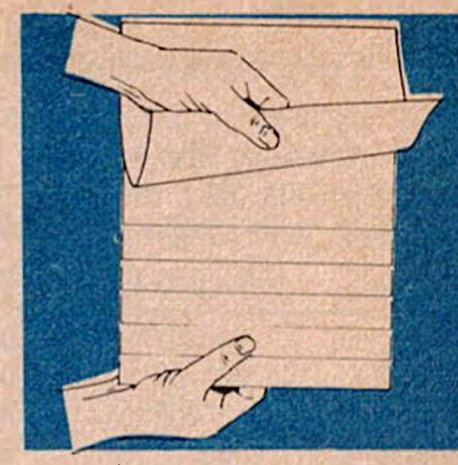
Ideal for sales presentations. Good contrast. Green glass rear projection screen performs well with either side facing audience. Functions best when all stray light is blocked from striking screen from behind. 11¾ x 11¾ x 1/8" thick. **No. 71,718 $6.00 Ppd.**

Jet Black Photographic Backdrop

Superior light absorbing fabric excellent when dark background is desired. Good for lining optical instruments where absorption of stray light is of utmost importance. Smooth velvet-like rayon pile soaks up light. Properly handled, it won't fade or fall. Easy to handle. light, strong. 52" wide. **No. 2503 Per yard. $3.50 Ppd.**

Not Available

Color Filters



Easily Cut Heat-resistant, cellulose acetate 0.01" thick filters, vibrant colored; transparent; may be used singly or in combinations for striking effects for: photographers; displays; light shows: theatricals; unusual home lighting; etc.

Book of 44 filters . . . each a different color	Size, 8 x 10"	**No. 70,638**	**$22.70 Ppd.**
	Size, 5 x 8"	**No. 60,403**	**12.37 Ppd.**
	Size, 1 X 4"	**No. 40,675**	**2.15 Ppd.**
Book of 6 (red, green, blue, cyan, magenta, & yellow)	Size, 8 x 10"	**No. 60,373**	**$6.00 Ppd.**
	Size, 2 x 2"	**No. 40,676**	**1.25 Ppd.**

Booklet of Spectral Absorption Curves for all of above filters. **No. 9081 50¢ Ppd.**

20 x 24" Color Filter Sheets **$ 3.25 each Ppd.**

No.	Color	No.	Color
82,010	Gold Amber (815)	**82,043**	Yellow Green (878)
82,009	Light Amber (813)	**82,004**	Med. Lemon (806)
82,039	Dk. Urban Blue (866)	**82,023**	Med. Magenta (837)
82,031	Daylight Blue (851)	**82,012**	Orange (818)
82,034	Dk. Med. Blue (857)	**82,017**	Flesh Pink (826)
82,038	L. Med. Blue (863)	**82,029**	Med. Purple (846)
82,000	Frost (801)	**82,014**	Light Red (821)
82,040	Light Green (871)	**82,015**	Medium Red (823)
82,041	Med. Green (874)		**$3.25 each Ppd.**

Flashlight Pointer

Focuses An Arrow Exactly On Desired Distant Spot!

Precision designed flashlight pointer, great for slide shows, film strips, etc. at sales meetings, exhibits, conferences, when teaching and lecturing. A bright, intense, concentrated light pinpoints interesting features on projected scene. Also, as dark room guide light. Uses 2 "C" batteries (not incl.). **No. 60,117 $6.95 Ppd.**

Replacement Bulb No. 40,383 $2.00 Ppd.

Eastman Kodak Rear Projection Screen

Replace ground glass with this black glass screening. Provides extreme contrast, sharp clear pictures, better diffusion. 20 x 24 x 1/8". **No. 85,002 $32.50 Ppd.**

Size 10 x 12" **No. 70,047 $13.25 Ppd.**

Size 5 x 6" **No. 40,137 $3.50 Ppd.**

Size 4 x 4" **No. 40,138 $1.75 Ppd.**

Fresnel Diffusion Screen: Superior to ground glass and other plastic types! This 3/32" thick plastic gives brighter images and better overall illumination (incl. corners & edges). Rigid (needs no support), may be cut to any size. Front or rear projection, camera obscura, tracing boxes, etc. 13½" F.L., approx. 50 lines/inch, 11-7/8 x 11-7/8". **No. 70,883 $5.00 Ppd.**

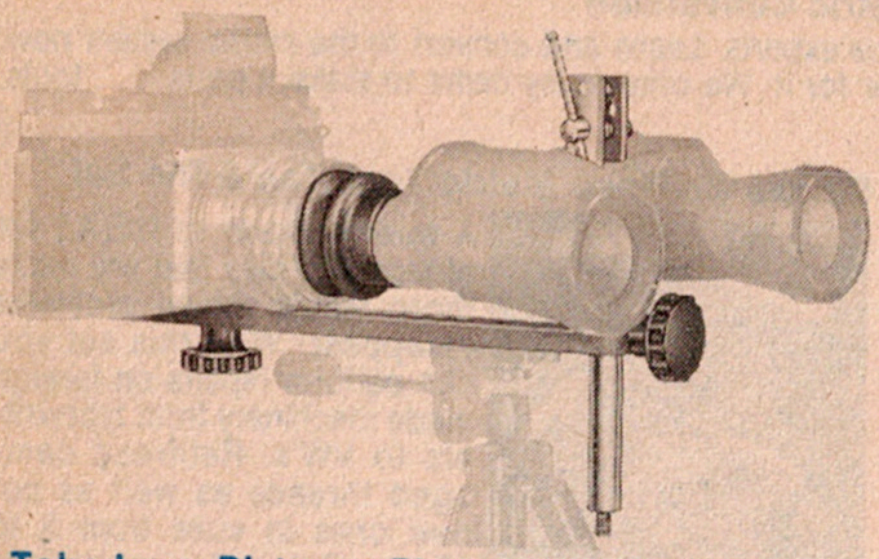
Cyclorama Cloth For Large Screen Front Or Rear Projection:

Used by movie industry for background projection. Canvas-like, flameproof; ideal for both front & rear projection large screens. Approx. 102" wide. Min. order 1-yd. (per running yd.) **No. 2515 $6.25 Ppd.**

Translucent Screening Front/Rear Projection

Extremely durable and dimensionally stable film, 0.004" thick. Superb matte surface on both sides provides sharp, clear images for wide-angle viewing. Mount on blind roller or frame for finished screen.

Screen size 40 x 40" **No. 80,079 $5.50 Ppd.**



Take Long Distance Photos With Your Camera And Binoculars (or Monocular)

Every photographer has dreamed of taking long-distance shots impossible with his limited equipment. Previously, expensive telephoto lenses were required. Now, the Edmund Camera-Binocular Holder enables you to take extreme long-distance shots inexpensively. By using it with your own camera and binoculars or monocular, you bring faraway objects much nearer than with ordinary telephoto lenses. For example, your 35mm camera and 7 x 50 binoculars will bring distant objects SEVEN TIMES CLOSER than by using the camera alone.

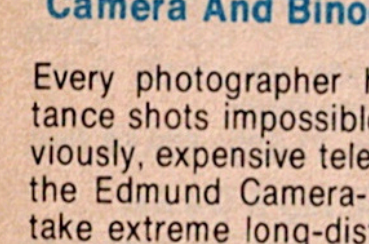
Think of the hundreds of new shot-possibilities that open up. In nature study (bird study), sporting events, rallies, your children playing unsuspectingly, etc. No need for heavy, clumsy telescopic equipment.

This sturdily-built holder screws onto standard ¼"-20-thread tripods. Rubber eyeguard supplied couples binocular (monocular) eyepiece to camera lens keeping extraneous light from entering the system. Directions for use with popular cameras incl. Metal holder has gray-wrinkle, chrome finish. Includes a ¼", 20-thread screw for use with threaded monoculars.

Monoculars used with this unit require either hinge lugs or threaded socket for mounting on camera tripods. Will not take binoculars without center pins. Can be used with still and movie cameras that have standard tripod socket, adjustable aperture (f/stop) and adjustable shutter speed. **No. 70,223 $13.75 Ppd.**

Monocular For Use With Holder Above

Imported 7 x 50 monocular attaches to any standard photo tripod. With holder above it makes an excellent telephoto system. Relative light efficiency 75; exit pupil dia. 7mm; 376-ft. field of view at 1000 yd. Case, straps, instr. Wt. 1 lb. **No. 70,639 $30.00 Ppd.**



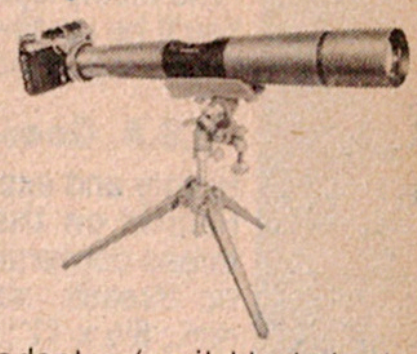
Mirror Lens . . . Folds 20" optical path into 7¼" barrel

Ideal for sports & nature photography. Compact, 500mm F.L. focuses from 10-ft. to infinity. 10-ft. field of view at 200 yd. superior to refractive lens system. F/8 fixed speed. Fits most 35mm SLR cameras ("T" adapter above required). 4½" dia.; 3½ lb. Standard (¼"-20) tripod socket. Sturdy mount allows 360° rotation of lens with camera. Incl. lens caps, haze filter, sun shade, case. **No. 1605 $105.75 Ppd.**

All About Telephoto Lenses

36 pages about telephoto systems you can build. Incl. taking long distance photos through binoculars; best types of filter; exposure factors; film; etc. **No. 9036 65¢ Ppd.**

15-60X Zoom Telephoto Scope



World's finest zoom scope for photography and ordinary viewing or target spotting. Aim, focus, zoom subjects to vivid close-ups for camera or eye. Great for astrophotography! All you need is a single lens reflex camera, a camera "T" compatible adapter & telephoto adapter (available below). Conventional 60X telephoto lenses cost over $1000; yet this scope gives no noticeable vignetting even at 60X.

15-60X Telescope Specifications. Aperture: f/16-f/64; equiv. F.L. for normal lenses: 1000-4000mm; angle of view: 3°-45'; field at 1000 yd.: 160-40 ft.

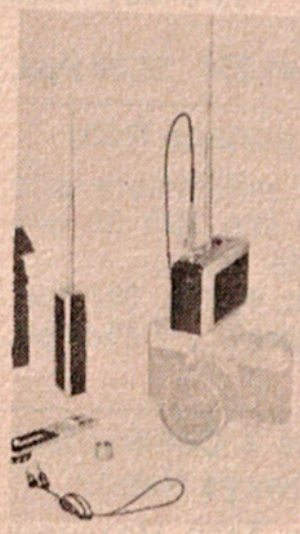
Coated 14 element optical system has big 60mm objective for crisp, bright image. Individual focus & zoom control knobs give infinitely variable magnification from 15-60X. Eye relief 15mm. Slideout sunshade; screw-on caps. Rigid, table-top tripod (13" high) with azimuth, height, coarse & fine adjustments. Locks at any angle, quickly disassembles. Scope 17½" long, black & tan finish. Lifetime mfg. guarantee against material defects. **No. 70,858 $258.00 Ppd.**

Telephoto Adapter. Screws onto scope's eyepiece; other end connects appropriate "T" compatible camera. Series V filter holder built in. **No. 40,955 $11.75 Ppd.**

Camera Adapters. "T" compatible. Connect SLR cameras as listed to telephoto adapter above.

Camera	No.	Price	Camera	No.	Price
Pentax	40,960	$5.50	Minolta	40,957	$7.70
Exacta	40,959	7.70	Nikon	40,956	7.70
Miranda	40,958	5.50	Canon	41,819	9.20

Other adapters? Write our Sales Eng. Dept.

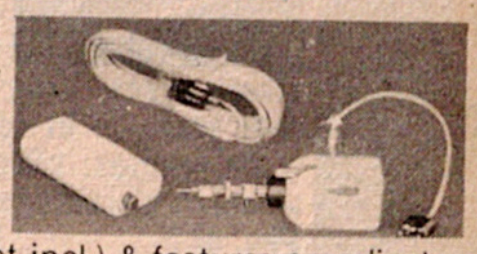


Electronic Remote Control

Opens a new world of photography! Take shots of yourself . . . in dangerous situations . . . etc.! Not for electric eye cameras . . . will operate shutters on manual setting. Operating range to 400 ft. Also remotely controls tape recorders, lights, etc. Receiver; transmitter; cable release for standard sockets; electrical adapter cord; instr. incl. 9v transistor & 4 AA batteries not incl.

No. 1620 $51.50 Ppd.

Electric Remote Control Shutter Release

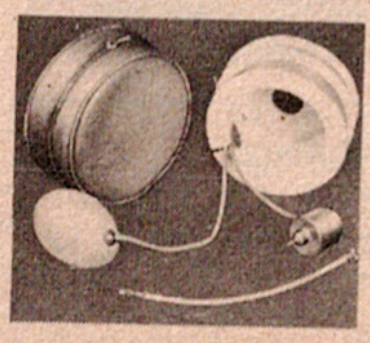


Trip the camera shutter at a distance . . . electrically! Snap yourself, a wild animal or "phototrap" a burglar when he opens the door! Operates on 2 penlight batteries (not incl.) & features an adjustable pressure control. Precocked spring-loaded plunger, electrically tripped. Comes with 30-ft. cord. For all cameras with standard threaded cable release socket.

No. 41,249 $22.75 Ppd.

30-ft. Extension Cord. No. 41,250 $5.75 Ppd.

Remote Control Camera Shutter Release



Pneumatic bulb & piston system for remote release of shutters up to 32 ft. (even B & T settings). With several, control widely separated cameras for use in nature study, surveillance, etc. 33-ft. of cable fits on plastic drum. Carrying case incl. Fits cameras with standard European threaded socket. **No. 50,227 $13.75 Ppd.**

METRIC CONVERSION . . . METROLOGY

Prepare for Metric Conversion

"The metric system is coming to the U. S." say the experts. Learn and convert to the metric system now. You'll be up-to-date, prepared, and possibly richer for it. We offer many items to make it easier . . . tools, measuring devices, etc. . . . for you to Metricate.

"U.S.A. Goes Metric"

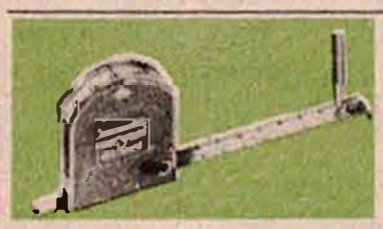
History and explanation of the Metric System. Helpful on the job; incl. tables on screw thread conversion, unified tolerances for metric threads, converts inches (.001-1.000) to mm.; 8½ x 11"; 54 pgs; paperback.

No. 9425 $1.50 Ppd.

Pressure-Sensitive Plastic Tape Rules

Hard-to-get: handy to stick on shop equipt., optical benches, etc. Sturdy plastic, ½" wide; sharp black 10cm, yard, meter markings on yellow or white bkgrnd. A roll of 50 each.

0-10cm in mm	**No. 40,269**	**$1.00 Ppd.**
0-36" in 1/8ths.	**No. 41,377**	**$1.50 Ppd.**
0-100cm in mm.	**No. 41,376**	**$1.50 Ppd.**



Steel MM and inch Tape

6½ ft. tape reads off inside measurements through clear plastic window on top. Locks so you can scribe straight lines or draw circles. Compass hole in tape end and flip-out point on case bottom. Graduated in 1/16" to 6¾ ft., and in mm to 2 meters, on both front and back. Chrome-plated steel case, nylon tape guide.

No. 40,882 $5.75 Ppd.

Deluxe 10-Ft.—3 Meter Tape Measure

Longer version of above. Has 2-way level built into 3 x 3-11/16" case.

No. 41,254 $9.00 Ppd.

6" Stainless Steel Comparison Rule

For measuring in both millimeters and inches. Inch face, divided into 16th on one edge and 32nds at the center line.

No. 40,073 50¢ Ppd.
6 or more . . . @ 45¢ Ppd.

Inches & Centimeters . . . Always Handy

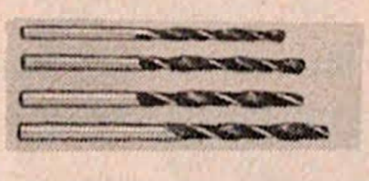
Plastic Tape Measures with 60 inches (in 1/16") on one side and 150 centimeters (in 1mm) on the other; a real time saver. Always carry one with you . . . in tool box, lab. Tape: 7/16" wide. Inches: black on white; cm: red on white. In plastic case.

Pkg. of 2	**No. P-41,407**	**$1.20 Ppd.**
Pkg. of 12	**No. P-41,408**	**$6.00 Ppd.**
Pkg. of 100	**No. P-60,858**	**$42. 25Ppd.**

Inexpensive Metric Drill Set

13 useful steel drills. (1.5 to 6.5mm), fit standard ¼" drill tap. Plastic case.

No. 41,557 $9.45 Ppd.



Originals! 500-Line Ronchi Rulings

Original masters, metallic filled on 1 x 2" glass, ¼" thick! 50-50 ratio of black to clear, run parallel to 1" edge, one line every .002", accurate to .0002". Slightly out of specs (less than .0001"), ordinarily worth much more.

No. 40,737 $35.00 Ppd.

Deluxe 41-Piece Metric Tool, Tap & Die Set

A quality (made in U.S.A.) set of taps and dies that will make those metric thread problems disappear! With this set you can perform repairs on foreign made machinery from typewriters to VW's. Rethread damaged threads as well as cut new ones in sizes from 3 to 12mm. Set includes a giant collection of 41 items: 1 ea. Tap & Hex Dies in 17dif. sizes (from 5/8" O.D. at 3mm x 0.60 to 1" O.D. at 12mm x 1.75); plain die stock; adj. guide die stock; 3 tap wrenches; screw pitch gage; & screwdriver.

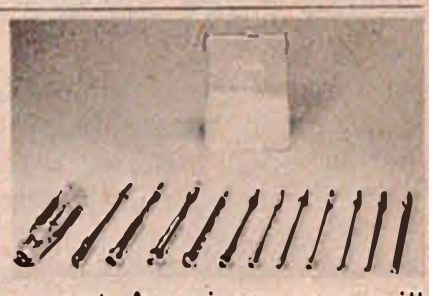
No. 71,620 $59.50 Ppd.

Inexpensive 40-Piece Metric Tool, Tap & Die Set

Ideal for the occasional user not seeking precision work, this 40-piece imported set includes enough variety to satisfy most hobby and minor repair needs. In metal box.

No. 71,437 $16.25 Ppd.

12-Pc. Metric Hex Nutdriver Set



Precision made to fit exactly, these 10 interchangeable Nutdrivers are useful & essential in the assembly and servicing of foreign-designed equipment . . . soon most American cars will also be made with metric hardware. Hex openings (width across flats) of 4, 4.5, 5, 5.5, 6, 7, 8, 9, 10 & 11mm. Extension piece (incl.) adds 4" of reach for hard-to-get-to spots. Plastic handle & nickel chrome extension have patented spring device that holds shaft firmly for driving, yet permits easy insertion & removal. Pocket-size plastic case with flat bottom for use as bench stand.

No. 42,001 $15.75 Ppd.

8-Piece Metric Hex Key Set.

Foreign electronic equipment need repair? If put together with metric hex screws, the only way to get it apart is with right-size metric hex key. Needed to work on foreign cars, cameras, instruments. MM Sizes: .71; .89; 1.27; 1.5; 2; 2.5; 3; 4. Plastic pouch.

No. 41,546 $2.95 Ppd.

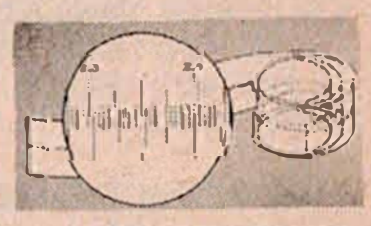
Metric Thread Measure

Determine size and number of threads on metric screws & bolts. You get 4 x 9½" plastic board with holes from 2.3 to 24mm to measure outsize dia. of threads, precision screw pitch guage measures exact metric thread in mm (size stamped on blades), and instr. for finding exact tap drill size.

No. 60,873 $3.50 Ppd.

Great New Metric Conversion Kit, see page 7.
Metric Dial Calipers and Micrometers, see page 127.

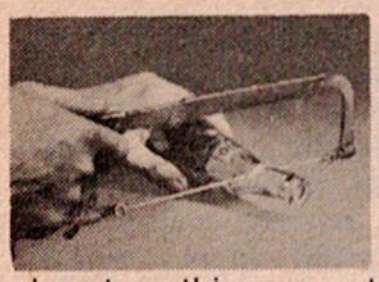
Precision Microscale, 20" In 0.005"



Contact replica on flexible Mylar, 0.007" thick x 1" wide. Graduated in 0.0005" from 0 to 20"; numbered every 0.100". At 70° F and 50% humidity, accuracy ±0.0025" in 20". Useful when measurements longer than average-size scales are required. Incl. magnifier, instr.

No. 41,188 $21.00 Ppd.

Tungsten Carbide Saw Blades



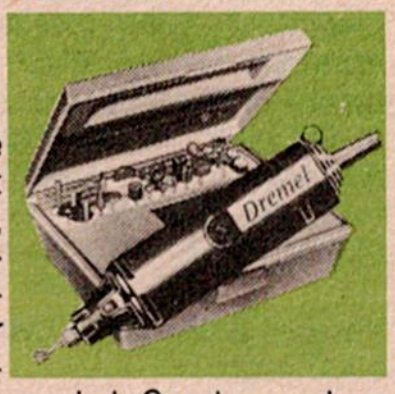
Cut like a diamond! Up to 10 times longer life than ordinary blades! Edges permanently coated with diamond-like tungsten carbide particles. Never require resharpening . . . no teeth to snag or break. Cut almost anything . . . stainless steel, plywoods, plastics, sheet metal, fiberglass, synthetic marble, glass, etc. Great for remodeling: go through knots, nails & screws. 10" blades, both fit standard hacksaw frames:

Hacksaw Blade for thin, straight cuts; easily follows a line. **No. 60,865 $2.50 Ppd.**

Rodsaw Blade. Super-sharp. **No. 70,928 $2.25 Ppd.**

Super-Compact Dremel "Moto-Tools"

Kits And Accessories To Create A Small Powerful Workshop!



"Moto-Tool", the versatile palm-sized, power unit that grinds, drills, sands, polishes, carves, routs, engraves, deburrs. Has 30,000 rpm permanent-magnet motor for abrasive wheel points and carbide cutters. Vibration-free, fan-cooled. Can be used on almost anything: wood, steel, non-ferrous metals, glass, ceramics, plastic, etc. Housing shockproof, high-impact plastic. 6-ft., 3-conductor cord for 115v, 60-cycle AC.

Kit "A" With 0.5-Amp "Moto-Tool" #260 (6x1½"; 9 oz.) Also contains: 2 high-speed steel cutters; 7 grinding wheels; 1 wire & 3 bristle brushes; felt polishing tip; 2 sanding discs; drum sander & 2 sanding bands; mandrel; 6 abrasive cut-off wheels; dressing stone; finger-grip extension; collet wrench; 4 collets (1/8, 3/32, 1/16, 1/32"); case. **No. 1608 $34.95 Ppd.**

Kit "B" With 0.9-Amp "Moto Tool" #280 (7-1/4 x 1-11/16"; 11 oz.) heavy-duty use. Accessories as in Kit "A". **No. 1609 $49.95 Ppd.**

Motor Speed-Control Unit for lighting fixtures, appliances, temp. units, and other devices using less than 5 amps. Solid state. 5½-ft. 3-wire cord; overload fuse; 2¼ x 4 x 5"; 1½ lb. **No. 1606 $16.95 Ppd.**

Drill Press has stage that can be raised or lowered (locks at any height). Accepts "Moto-Tools". Ht. 12". Shpg. Wt. 3 lb. **No. 1607 $19.95 Ppd.**

Universal Stand leaves hands free. Clamp holds "Moto-Tools" at any angle; non-tip cast iron base. Max. ht. 8". Wt. 2¾ lb. **No. 1610 $8.50 Ppd.**

Dremel Router Attachment and Accessories

Easily mount this to Dremel Moto-Tool models 260, 270, or 280. It spins chisel-shaped bit to 30,000rpm, producing smooth surfaces that need no sanding. Calibrated depth control; removable edge guide; adjustable fence (0 to 3¾"). Instr. **No. 1621 $10.75 Ppd.**

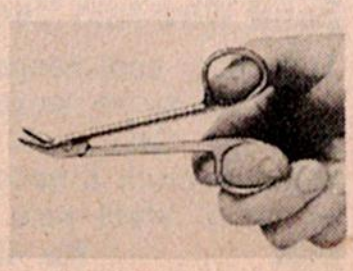
6-Pc. Router Bit Set. For routing, inlaying, mortising in wood and soft materials. High speed steel; 6 shapes; 1/8" shanks; pouch. **No 1623 $18.75 Ppd.**

12-Pc. Emery Wheel Point Set. Highest industrial quality with long abrasive life; 12 shapes; 1/8" shanks; storage pouch. **No. 1622 $7.45 Ppd.**

12-Pc. Steel Cutter Set. Cut, shape, and hollow most metals, plastics, and wood. For grinders, drills and flexible shaft machines. High speed steel; 12 shapes; 1/8" shanks; pouch. **No. 1624 $16.50 Ppd.**

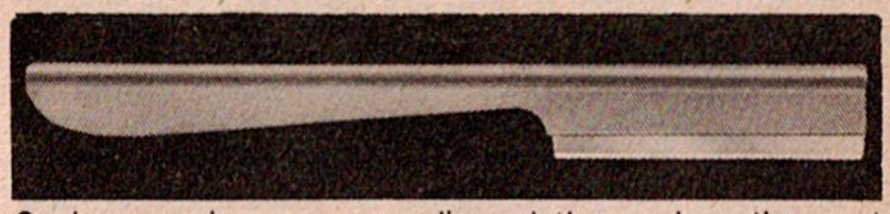
NOT AVAILABLE

Quality Wire Cutter



Perfect for use in modelmaking, experimenting, etc. Wire cutter has serrated edge so it will cut finest drawn wire without slippage. **No. 41,655 $5.50 Ppd.**

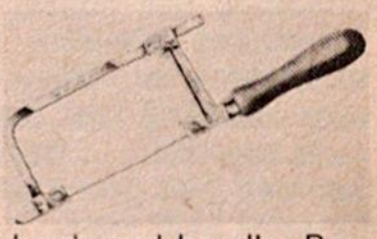
Throw-Away Razor Blade Knives . . . For Florists, Jobs Around the House, etc.



So inexpensive you can discard them when they get dull. Eliminates cuts when changing knife blades or handling razors. Sharp single edge blade in handle is ideal for industrial and hobby use. Florists love them. Save time, trouble and money. Buy in lots of 100. Length 5", blade 2" long.

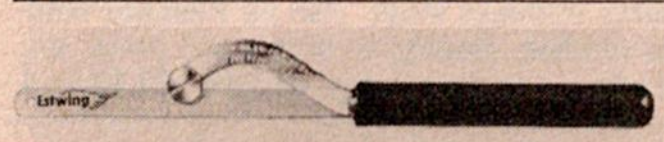
No. P-70,369 Pkg. of 50 **$4.75 Ppd.**
No. P-70,372 Pkg. of 100 **8.50 Ppd.**

Adjustable Precision Jeweler's Saw and Blades



Great for hobbyists, do-it-yourselfers, model makers. Cuts gold, silver, platinum, nickel, brass, copper, steel, and aluminum. Piercing saw frame exceptionally rigid and well balanced with comfortable hardwood handle. Bow design insures correct tension. Blades held firmly by wing-screw serrated clamps. Adjustable frame (takes blades up to 6"): depth of bow: 2¾"; steel plated parts. Comes with 1 blade. **No. 41,639 $3.25 Ppd.**

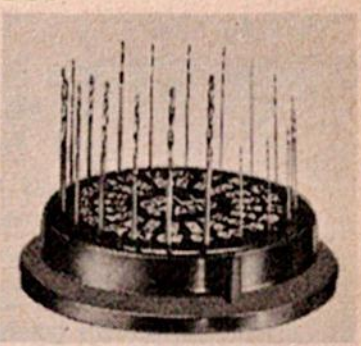
30—5" Blades. 3 different sizes for intricate work & general use (.016-.060" thk.). **No. P-41,976 $2.45 Ppd.**



Miracle Mini-Saw

Reaches hard-to-get-to places. Cuts where other saws can't. Starts easily, cuts flush, saws curves. All steel construction, vinyl grip, finger locking adjusting screw, uses standard hacksaw blades (even broken ones). 11¾" long. 1 blade incl. **No. 60,892 $2.49 Ppd.**

20-Pc. Precision Micro Drill Set



The perfect drills for precision drilling required in electronics, jewelry making, metalcraft, woodworking and many other hobbies. Premium quality carbon steel drills No. 61 to 80 with indexed plastic case & cover for convenient storage. Sizes range from .013 to .039". Stand is clearly marked with drill numbers & decimal equivalents for easy identification.

Set of 20 Drills **No. 41,941 $8.40 Ppd.**

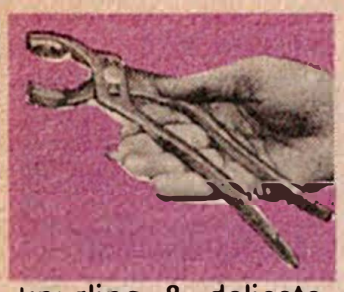
Pin Chuck For Holding Small Drills

Hold small drills firmly & centrally in a drilling machine. Chuck comes complete with 3 collets (0 to 1/32"; 1/32 to 1/16"; 1/16 to 3/32"). Double acting body movement of tapered collet(s) insure whole length of collet (not just tip) grips drill. Accurate collet centering is insured. Imported.

No. 41,643 $4.25 Ppd.

Automatic Punch . . . an indispensable marker

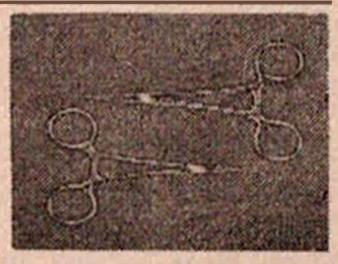
Automatic spring-operated action easily adjusts to make a uniform impression of any size between its limits of approx. 5 lb. (very light dotting) & 30 lb. (heavy punching). 4½" long. Instr. Imported **No. 41,633 $4.95 Ppd.**



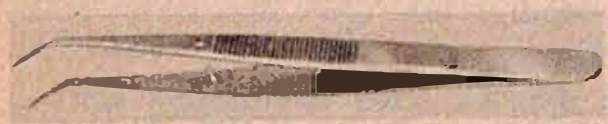
Slip-Joint, Soft Jawed Pliers

A must for assembly & disassembly of optical instruments! 3-position, slip-joint pliers loosen or tighten retaining rings on lenses from ½-2¼" dia. Nylon nonslip cushions in jaws protect fine knurling & delicate finishes. 9¼" long pliers remove spigots without scratching, jar caps without bending, etc. Strong cadmium-plated steel. Sure-grip handles apply max. uniform pressure. **No. 60,832 $8.25 Ppd.**
2 Replacement Cushions **No. P-30,664 $1.75 Ppd.**

Hemostat Surgical Pliers



Here's your "third hand" for removing fish-hooks, flytying, assembling miniature parts for toys, trains, etc. Many industrial uses including heat sinks! Jaws lock closed and hold parts together . . . frees hands to solder or assemble. Serrated jaws give a good grip. 2 tip sizes avail. Tip A for extra small work.
5" Hemostat, Tip A **No. 40,570 $2.50 Ppd.**
5½" Hemostat, Tip B **No. 40,571 $4.25 Ppd.**



Angled Tweezers

For picking up finest wire & delicate items; genuine surgical instrument; non-rusting stainless steel. Use as filament holder, to assemble models, clocks; to sort small parts; etc. Solder won't stick. **No. 41,651 $2.10 Ppd.**

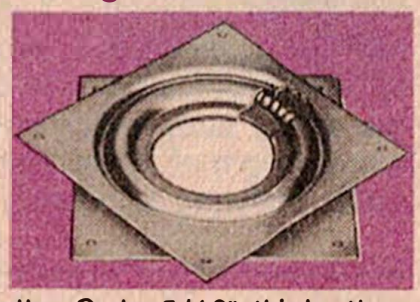
Serrefine Clip

Stainless steel; strong spring tension for holding very fine wire & thread. Great for hobbyists . . . makes good soldering clamp. **No. 41,656 $5.95 Ppd.**

"Super Glue" . . . 1 Drop Holds A Ton!

Sets in seconds! Joins, welds, seals, mounts . . . bonds rubber, plastic, wood, etc.! Revolutionary new clear bonding liquid makes ordinary adhesives old-fashioned. Requires no solvents, catalysts or heat. Mend china, bond silicone chips to ceramics, attach metal to glass; fix parts for riveting; etc. Tensile strength to 5,000 lb. in. Impervious to most chemicals (seeps into cracks others can't). Non-toxic.
2-Gram Tube No. 41,508 $1.75 Ppd.
1-Oz. Bottle No. 41,509 $7.55 Ppd.

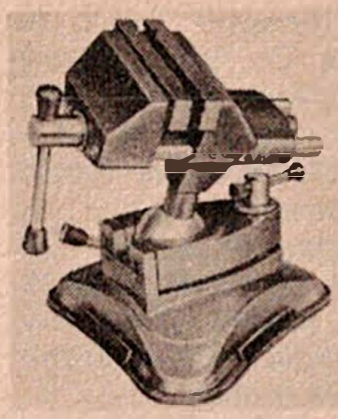
Build Heavy-Duty Ball Bearing Turntables



Easily build heavy-duty turntables to 60" dia. for wts to 1,000 lb. Use in parts racks, machine stands, displays, corner cupboards, boat seats, etc. Heavy-gage zinc-plated steel. Deep ball races filled with precision balls. Only 5/16" thick, they give stability, smooth operation. Easy to attach, screw holes offset so load bearing sections clear each other.

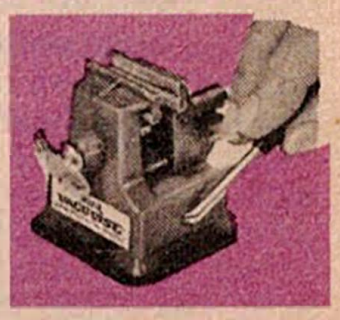
No.	Plate Size	Center Hole	Turntable Size To	Load Lb.	Wt. Oz.	Price, Ppd.
40,601	4" sq.	2-1/8"	25"	300	6	**$1.25**
40,602	6-1/8" sq.	4-11/16"	30"	500	10	**1.50**
60,327	12½" rnd.	6-5/16"	60"	1,000	30	**3.95**

Vacuum-Base Vise With Universal Swivel

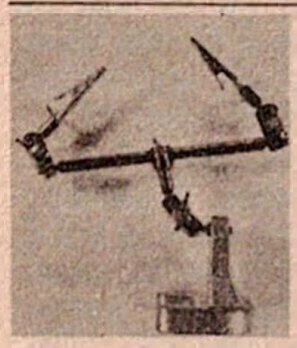


Adjustable head locks securely in any position . . . super-holding vacuum base anchors to non-porous smooth surfaces. Portable, fastens instantly! Universal ball joint; working angles: 360° horizontal; 180° (max.) vertical. V-groove iron jaws open to 3" on steel guide rods with precision screw action. Jaws have 3 x 5/8" face. Slip-on rubber jaws for delicate work incl. 6¼ x 6¼". **No. 71,144 $17.98 Ppd.**
Regular-Vacuum-Base Vise. 4¼ x 5¼" model without universal ball joint. **No. 70,814 $7.95 Ppd.**

Miniature Vacuum Vise . . . Only 2-5/8 x 2-3/4 x 3-1/2"



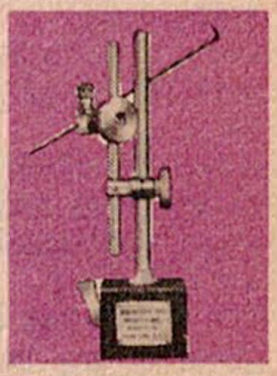
Ideal for fly-tying, glueing, jewelry-making, filing, etc. Attaches quickly and easily with just a flick of the lever . . . adheres tightly to any smooth and non-porous surface. No screws or bolts. High impact plastic base. Wt. 4½ oz.
No. 41,728 $3.90 Ppd.
Vacuum Base. Make things portable & attachable. 4¼ x 5 x 2" high. **No. 60,567 $4.25 Ppd.**



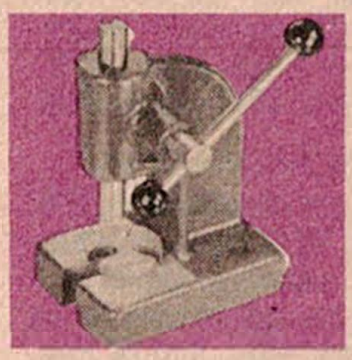
Flexible Holding Jig . . .

Frees your hands while soldering, welding, or gluing! 3 double ball joints & 2 spring clamps . . . adjust to almost any position! Won't tip due to its heavy (9 oz.) base. Alligator clamps hold objects (up to 1 lb.) tightly.
No. 42,089 $7.95 Ppd.

Magnetic Base Holder With Scriber



Holds all types of dial indicators & scribers. 2 magnetic surfaces (bottom and back). Handle turns magnets on & off, variable strength up to 66 lbs. Rod travels 6 in. Accommodates scriber up to 3/32" dia. Scriber incl. Ht. 13½"; base 2¼" x 1½". 3 lb. Fitted wood case. **No. 70,619 $21.25 Ppd.**



Mini-Arbor Press

Designed for optics industry; precision construction and size make this mini arbor press ideal for model makers, jewelers, locksmiths, instrument makers, clock makers, camera and gun repairmen . . . anyone who works with small delicate mechanisms. It can punch, rivet, size, flare, crimp, form, straighten, assemble, etc. Use to press wheels and gears on and off shafts. A good companion for modelmaking lathes; ideal for apartment workshops. Frame 4¾" high; ram ½" dia. and 2" travel; throat 1" deep; table slots 1/8, 1/4, 3/8"; 15.1 leverage ratio, ram pressure over 6,000 lb.
No. 41,740 $17.85 Ppd.
Extra ram. Soft steel; can be machined to provide low cost special tooling. **No. 41,739 $2.90 Ppd.**

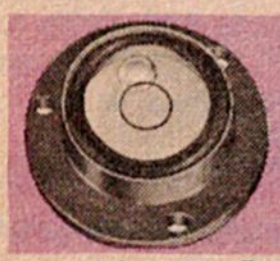
Bend Wire Into Useful Shapes

Turn wire, coat hangers, etc. into peg board hardware, stakes, springs, tools, toys, art. Cast alum. jig with cutting blade, fulcrum & bending pins handles up to ¼" steel wire. 100 illus. projects. **No. 40,870 $2.95 Ppd.**

Level Reads Angles, Too!

Get fast, accurate readings from 0 to 90° in any quadrant by merely placing it on surface to be checked. Grooved base helpful when checking pipes, rods, etc. Sensitive to 0.05°. High impact plastic housing. 5 x 5" overall with 4" dial. 5" rule and scale for angles, slope, and pitch. 2" double-check bubble vials. **No. 60,870 $8.95 Ppd.**

Inclinometer without vials. 2" vertical scale; 3-5/8" horizontal scale; 2-7/8" dia. dial. 2-3/8 x 3-5/8" overall.
No. 41,482 $3.98 Ppd.



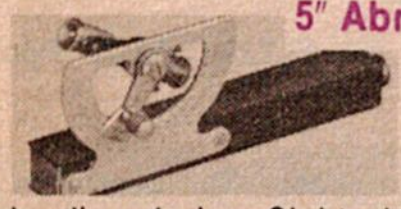
Sensitive Circular Level

Level in all directions with one fast reading. When bubble is centered, base is entirely level. Use on cameras, telescopes, or industrial instruments, for leveling appliances, Hi-Fi turntable, etc. Base dia. 1". Acute sensitivity of 45 min. ±10% each 0.1" bubble move. **No. 40,068 $3.00 Ppd.**

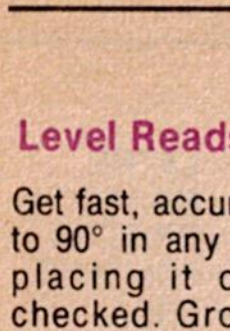
Level Measures Inclination

Read angles up to 42° and inch rise per ft. to 10". True level readings at a glance. Bob floats in clear liquid. 2 x 2 x 1" plastic case. Doubles as simple accelerometer. **No. 60,046 $2.50 Ppd.**

5" Abney Reflecting Hand Level



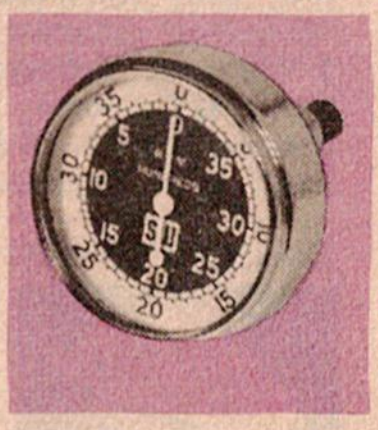
Quick! Accurate! Use as clinometer to measure slope and vertical angles; for height-range calculations; as leveling device. Sight object in eyepiece; when bubble is on crosshair, read angle instantly. Graduated from 0-90°, vernier readings to 10 min. Incl. leather case, strap, instr. Imported. **No. 50,016 $22.25 Ppd.**



Dial Thickness Gauge

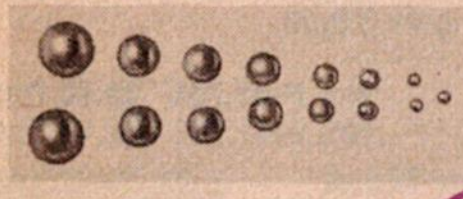
Measures thickness of paper, cellophane, metal, etc. 2" dial in enameled frame with thumb release. 0.5" capacity in 0.001" increments; accurate: +0.0008". Hi-grade tool steel, hardened, ground and lapped. 0-5 revolution counter, zero adjustment, and instr. **No. 41,485 $22.25 Ppd.**

Portable Hand-Held Tachometer



Reads clockwise & counterclockwise rotation instantly! Hold against end of rotating shaft . . . reads directly in rpm. Use on motors, saws, fans, pumps, lathes, power tools. 0-4,000 rpm; 2% accuracy; 2½" dia. scale in 100 rpm steps. Dust & waterproof steel case. Instr. incl.
No. 41,824 $17.85 Ppd.

Assorted Sets of Precision Steel Balls

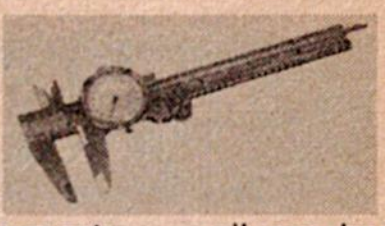


Chrome steel balls, hardened all the way through, with a sphericity of 25 millionths of an inch. Excellent as: go/no go gauges for holes; low friction waves in interferometers; lathe centers when machining hollow tubing; highly elastic homogenous bodies for use in impact experiments; check valve construction; etc. Instr. incl.

NOT AVAILABLE

146 balls in 23 sizes; 1/16-3/4"; 1/32" increments. 10 ea. of small, 2 ea. of large. **No. 41,525 $7.95 Ppd.**
11 balls in 11 sizes; ¾-1¼". **No. 41,526 $8.25 Ppd.**

Dial Vernier Calipers



. . . Accurate & Fast
Easier and faster to use than regular vernier calipers or micrometers. Takes both inside and outside plus depth measurements . . . all can be read from dial in .001". Guaranteed accurate to .001". Beam graduated in inches and tenths of inch.

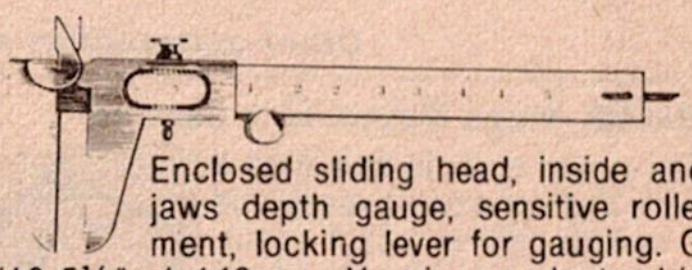
Extra long jaws, 4" capacity, insure perfect alignment. Thumb roll, fine adjustment has a slipping feature that prevents forced readings; thumb nut permits locking in any position. All stainless steel with satin-chromed finish. Totally enclosed dial excludes dirt. Adjustable dial permits resetting. 7" long x 2½" wide. With rugged leather case. Imported. Bargain priced.
No. 60,452 $27.25 Ppd.
Deluxe 6" Capacity No. 41,458 $34.25 Ppd.

As above, but with dial graduations from 0 to 10mm in 0.1mm divisions. Can easily be read to an accuracy of .05mm. 7 x 2½" wide. Beam scale graduated to 10 cm in 1 cm divisions. Maximum capacity 105mm (outside length and depth), 5 to 110mm (inside length).
No. 60,509 $26.50 Ppd.

Low-Cost Plastic Dial Calipers

Ideal Swiss-made measuring tools for students, draftsmen, camera dealers, & hobbyists. Gives direct readings in .001" or .1mm. Perfect where extreme precision is not required. Accurate to ± .002" or .05mm. Measures inside, outside step and depth. Prismatic guide for long accuracy. Asbestos reinforced polyamide. Incl. instr., case.
Inch. Jaw capacity 5¼". **No. 41,709 $8.75 Ppd.**
Metric. Jaw capacity 130 mm. **No. 41,710 $7.00 Ppd.**

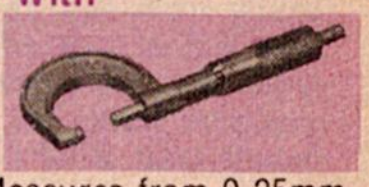
Inexpensive 5" Vernier Caliper: Inches & Metric



Enclosed sliding head, inside and outside jaws depth gauge, sensitive roller adjustment, locking lever for gauging. Graduated 1/16-5½", 1-140mm. Vernier reads to 1/128" and 0.1mm. **No. 40,598 $3.95 Ppd.**

Metric Tool Sets & Tape Measures, see page 124.

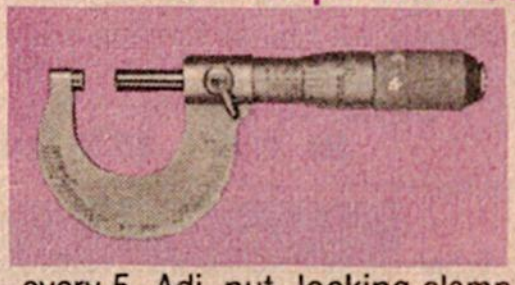
Precision Metric Micrometer With Carbide Faces



"We checked this micrometer against other precision micrometers by leading manufacturers and found this the best value!" Measures from 0-25mm and is accurate to .005mm or better. Barrel graduated every .5mm. Constant pressure thimble graduated in .01mm. Dull chrome finish; lever-type lock. Packed in wood box with setting spanner. **No. 41,768 $24.50 Ppd.**

Student Metric Micrometer. Inexpensive beginner's micrometer reads to .01mm. Adj. anvil. Capacity 0-25mm. Instr. incl. **No. 41,428 $5.00 Ppd.**

Micrometer Caliper With Carbide Faces



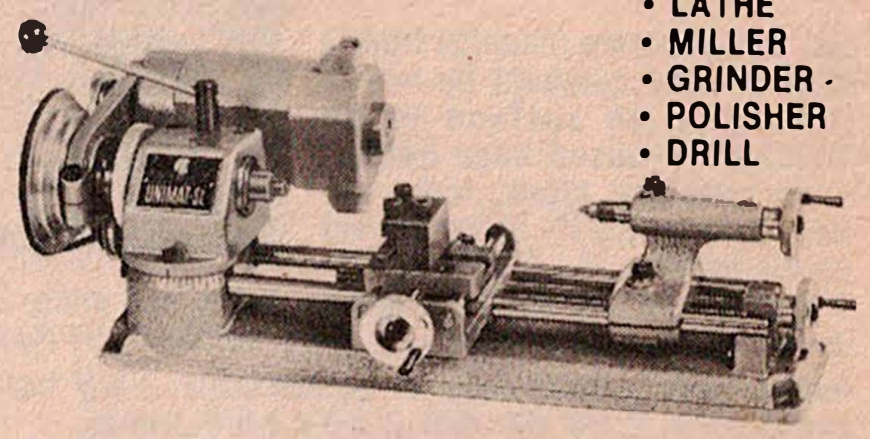
Measures 0-1"; accuracy .0001"; parallelism to .0005". Vernier scale on barrel numbered every .0001"; thimble scale in thousandth, numbered every 5. Adj. nut, locking clamp. 5½ oz. Built-in ratchet-lock wrench; case. **No. 60,524 $22.00 Ppd.**
Student Micrometer . . . reads to .001". Adj. anvil. Capacity 0-1". Accuracy .001". **No. 60,666 $5.00 Ppd.**

UNIMAT

5-IN-1 PRECISION MACHINE SHOP

For the home mechanic, hobbyist, research worker, technician, industrial modelmaker or experimenter, UNIMAT offers the versatility and convenience of 5 basic shop machines in one compact, precision tool. Turn, face, bore, grind, saw, mill, thread, drill, sand, buff, divide—do hundreds of jobs on this one multi-purpose machine. Change set-ups in seconds!

Headstock rotates and revolves 360°, removes from bed for vertical use. Ball bearing spindle is accurate to .0005". Ball bearing idler provides 11 speeds (900-7200 rpm). Basic UNIMAT includes 1/10 hp, 115v AC motor, steel column, face plate, centers, dog, grinding wheel



- LATHE
- MILLER
- GRINDER
- POLISHER
- DRILL

arbor, belts, wrench, wooden chest. Lathe swings 3", takes 6.9" between centers. Drill capacity 6¼". Drills to center of 6¼" circle. Spindle feeds 5/8". Anyone can use UNIMAT. 40-page illus. handbook details how. Made in Austria. 14½" x 5" x 5". Shpg. Wt. 33 lbs.

No. 85,175 $199.50 T.C.C.

POPULAR UNIMAT ACCESSORIES

1. Power Carriage Feed. (1290). Feeds .0008" per spindle rev. **No. 70,843 $51.75* Ppd.**

2. Circular Saw. (1240). 6 x 8" table. Uses blades to 3½". **No. 70,844 $34.00* Ppd.**

Saw Blades for No. 70,844
2-3/8" dia. (wood) **No. 40,972 $4.50* Ppd.**
3-9/16" dia. (wood) **No. 40,973 $5.20* Ppd.**
2-3/8" dia. (metal) **No. 40,971 $5.25* Ppd.**

Headstock Raising Block. (1311). Permits use of saw attachment above. **No. 40,926 $5.40* Ppd.**

3. Jig Saw. (1080). 6 x 8" table with 12 ass't. blades. **No. 71,058 $52.00 Ppd.**

4. Milling Table. (1210). 3 x 5". Holds work for milling and drilling. **No. 60,585 $21.00* Ppd.**

5. Steady Rest. (1040). Holds 1½" bars, tubes, for machining. **No. 60,736 $18.00* Ppd.**

6. Index Head. (1260). Divides, spaces for gear cutting, etc. **No. 60,587 $26.00* Ppd.**

7. Lathe Chucks: 4-Jaw Independent. (100). 2¼" capacity. **No. 60,583 $40.75* Ppd.**
3-Jaw Universal (1001). 2¼" capacity. **No. 60,659 $38.75* Ppd.**

8. Tool Bit Set. (1100). Six ¼" HSS basic lathe tools. **No. 40,927 $20.75* Ppd.**

9. Vise. (1010). Fits on cross slide. Capacity 1-1/8". V-milled jaws. **No. 60,584 $18.25* Ppd.**

10. ¼" Drill Chuck (1005). **No. 41,737 $13.25* Ppd.**

11. Roughing Tool Bit (2820/01).

Drive Belt Set. **No. 41,738 $3.05* Ppd.**

***Includes extra for postage.**

"Miniature Machining Techniques." For beginners and experts. Covers use of UNIMAT and accessories. 40 pages 8½ x 11", over 200 illus. **No. 9378 $2.00 Ppd.**

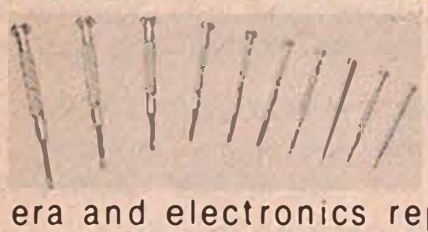
Other accessories available on special order.

Brake-Switch Stops Motors in a Second

Safely stop power tools in less than a second with this remarkable electronic "brake" switch. Motor won't coast, reverse, or restart until turned on again. Works on 110-120v AC (brushless) motors drawing up to 10 amps (12 amps for intermittent use). Just plug motor into brake switch; can be moved easily from tool to tool. Nothing to wear out or lose adjustment. Ideal for radial and table saws, lathes, drill presses; enhances precision work. Incl. 3-prong 9-ft. heavy duty cord and mount; instr. 2 x 2 x 3". Wt. 1¾ lbs.

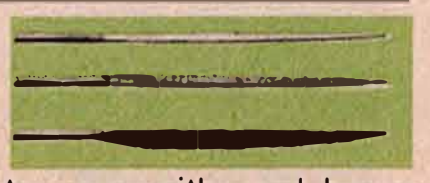
No. 71,795 $21.00 Ppd.

Precision Micro Screwdriver Set



A top-quality, 10-piece, screwdriver set ideal for intricate assembly, tool and watchmakers, jewelers, instrument repairmen, camera and electronics repairmen, and hobbyists. Professional screwdrivers with swivel tops; non-slip, knurled shafts; and tempered steel blades for fine precision work. Each screwdriver marked with blade width; 0.6-3.8mm (0.024-0.15"). Comes in see-thru plastic pouch. **No. 41,671 $5.50 Ppd.**

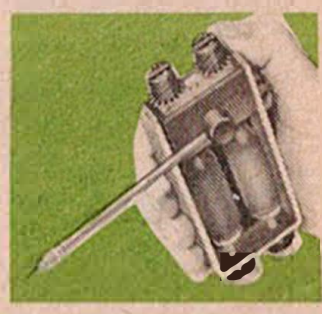
Needle Files



12 shapes (flat, round, taper square, oval, diamond, wedge, etc.) Coarse to fine. Each 5½" overall. For industry, gunsmiths and home shops. Plastic case. **No. P-30,113 $6.20 Ppd.**

Gas Welding Mini-Torch

• Welds • Brazes • Solders



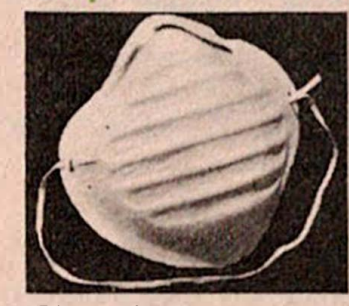
For very strong brazed joints on steel, copper, brass, bronze, aluminum & zinc base alloys. This self-contained unit has a 5000° F. pinpoint flame. Ideal for hobbyists! At welding temps., "Micronox" consumed 2-3 times as fast as butane. Needle valve controls flame. Torch (1¼ x 2 x 5¼"); 3 tips; 1 butane & 2 "Micronox" cylinders; instr. **No. 60,919 $23.95 Ppd.**

2 "Micronox" Cylinders **No. P-41,691 $2.00 Ppd.**

2 Butane Cylinders **No. P-41,692 $1.25 Ppd.**

Brazing Rod Kit. 18 silver & aluminum brazing rods; 2 jars flux; hot block; instr. **No. 71,577 $6.95 Ppd.**

Disposable Masks For Non/Toxic Particles



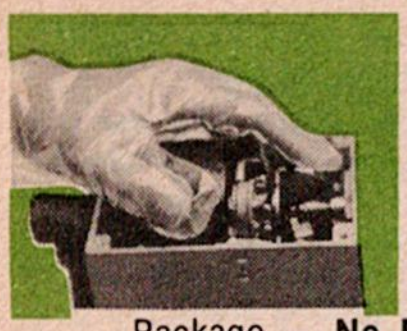
Protect against dust, powder & spray particles. Easy to breathe through: 3-5 times filter area of others. Blocks 90.6% of airborne particles under 5μ. Elastic band; metal nosepiece easily shaped. Wt. only 3.8gm.

Pkg. of 50 **No. P-41,765 $9.00 Ppd.**
Pkg. of 10 **No. P-41,764 $2.50 Ppd.**

All-Purpose Respirator Mask

Small, compact, mask fits in pocket or purse. Ideal for garden, garage, shop, or in high pollen or polluted areas. Protect against nuisance dusts, non-toxic paint spray, mists. Washable filter; adjustable headband. **No. 41,578 $2.00 Ppd.**

YOU MUST BE SATISFIED OR YOUR MONEY BACK.

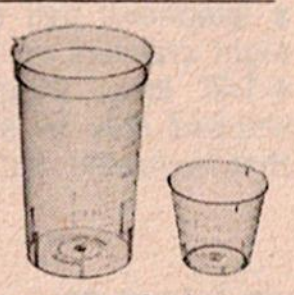


Polyethylene Gloves

Soft, lightweight, protect hands from harmful or dirty substances. They resist solvents, chemicals, detergents. Waterproof. Useful for labs, shops, hospitals, mechanics, painters.

Package of 100 — **No. P-60,317** Medium **$2.95 Ppd.**
No. P-60,321 Large **2.95 Ppd.**

Disposable Plastic Cups



For mixing and measuring. Less expensive than paper, much more convenient. 1-oz. size costs only 1½¢. Crystal clear polystyrene for instant check on color and transparency of contents. 1-oz. size marked in cu. cms., ml, teaspoons, tablespoons, oz. & drams; smooth beaded lip. 6-oz. size marked in cc's, ml's; won't tip, non-spill pouring lip.

1-oz. Size. Pkg. of 100. **No. P-60,365 $1.50 Ppd.**
1-oz. Size. Pkg. of 400 **No. P-70,624 6.00 Ppd.**
6-oz. Size. Pkg. of 20. **No. P-60,364 1.75 Ppd.**
6-oz Size. Pkg. of 100. **No. P-70,625 8.00 Ppd.**

Protective, Zip-Lip Poly Bags (4-mil)

Seal, open, and reseal indefinitely.

4 x 4″: (10) **No. P-40,681 $1.25 Ppd.**
(100) **No. P-60,395 $10.00 Ppd.**
9 x 12″: (5) **No. P-70,684 $1.00 Ppd.**
(100) **No. P-70,690 $17.00 Ppd.**

Hard-To-Find Spring & Stock Assortments

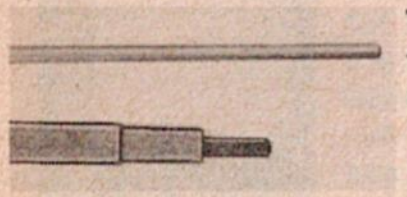
Save time and money with these many useful assortments! Flat spring extension springs and round music spring wire. 12″ lengths. Invaluable for experimental shop, industrial maintenance, gun and locksmiths, instrument repair, hobbyists, etc.

100′ Assorted Flat Spring Steel Strips. 1/16″ to 3/8″ width, 0.16″ to .059″ thick. **No. 60,618 $4.75 Ppd.**

12 Assorted Compression Springs, wire sizes, .016″ to.058″ thick, O.D. .091″ to .312″. **No. 60,622 $4.25 Ppd.**

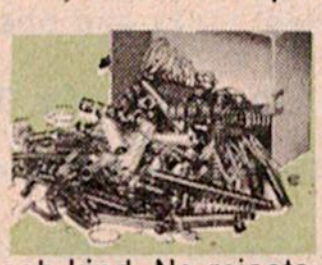
100′ Music Wire. Asst'd. dia. from .020″ to .062″ thick. **No. 60,619 $4.25 Ppd.**

12 Assorted Extension Springs, wire sizes .012″ to .020″ thick; O.D. .086″ to .187″. **No. 60,620 $4.25 Ppd.**



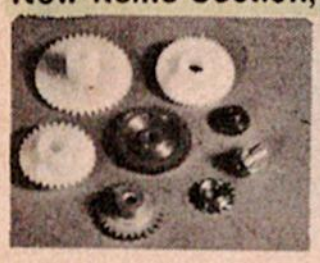
Telescoping Brass Tubing. 1-ft. lengths; .015″ wall. 15 Pieces: 1/16 to ½″ O.D. in 1/32″ increments. **No. 60,819 $5.50 Ppd.**

120 Piece Spring Assortment



Hobbyists, homeowners, experimenters! Box of 120 small compression, extension, and torsion springs of various sizes and tensions has almost any one you'll need. 30 different springs, four of each kind. No rejects, just first quality from a leading manufacturer. Wt. 8 oz. **No. 70,860 $5.25 Ppd.**

More new and unusual tools are located in the Latest New Items Section, Pages 5-19.



Gear Assortment

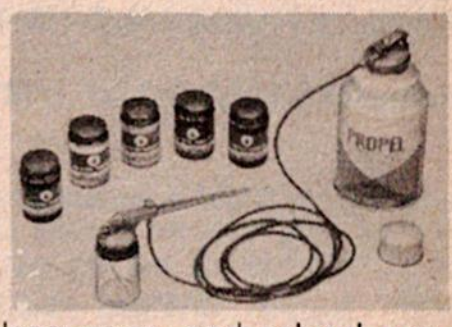
16 quality brass, nylon and steel spur gears perfect for mechanical motion experiments. From 5/16″ to 1¼″ dia. 24, 32, 40 pitch. **No. 60,352 $1.50 Ppd.**

Handy See-Thru Flashlight

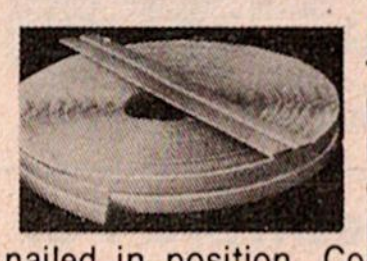
Hundreds of uses at home and on the job!

More than just a flashlight . . . it actually throws a beam of light along your line of sight. Exclusive "see-thru" design permits bright illumination of recessed areas that you couldn't "light-up" and at the same time look into before now . . . such as: gun barrels, pipes, sockets, auto parts, etc. For sportsmen, mechanics, hobbyists, doctors, dentists, electricians, plumbers, factory use . . . anywhere illumination along the line of sight is needed. Also serves as a general-purpose flashlight. **No. 71,534 $5.25 Ppd.**

Spray Painting Kit



For professional refinishing or invisible touch-up on family cars, appliances, models, bikes & boats. Create textures; make designs or stencils; mix your own colors! Great for finishing models, figurines, decoupage, and school projects. Air brush, adjustable paint tip, & vinyl hose; on/off air valve; mixing jar; 1 oz. thinner; 14 oz. propellant; red, yellow, blue, & black paint (1 oz. ea.); and instr. incl. **No. 71,413 $11.50 Ppd.**
Extra propellant, 14 oz. **No. 60,588 $2.75 Ppd.**



Polypropylene Piano Hinge

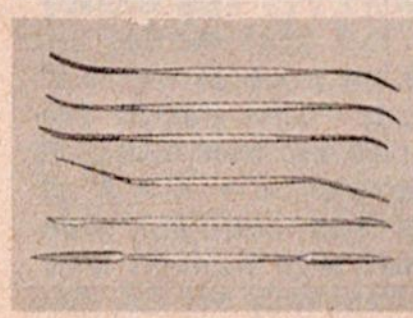
Takes 1,000,000 Flexes Without Failure. For boats, doors, bins, boxes. Resists acids, oils, grease. Can be screwed, punched, sheared, stapled or nailed in position. Colorfast white, 1½″ wide x .100″ thick. No holes.

100-ft. coil. **No. 70,778 $45.00 Ppd.**
25-ft. coil. **No. 70,779 13.50 Ppd.**
6-ft. coil. **No. 60,519 4.50 Ppd.**

Spray Instant Galvanize . . . And Rust-Proof Metals

For Three Years Or More

Use this zinc-rich, instant cold galvanize wherever metal is exposed to corrosive conditions. So many uses . . . auto bodies, farm machinery, boats, motor bikes, TV aerials, golf carts, air conditioning and refrigeration units, tools, patio furniture, anywhere. This galvanize is *not* a paint! Where applied it generates a positive electric current that flows to the base of the metal and forms a zinc coating. Rust and corrosion attack only the coating, leaving the metal rust-free and protected. Equals hot-dip galvanizing at half the cost. 16-oz. aerosol can (covers about 50 sq. ft.). **No. 60,978 $4.75 Ppd.**

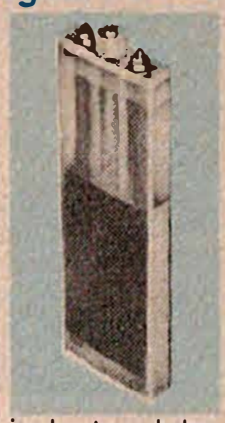


RIFFLER FILE SET

6 high quality riffler files . . . the most popular and useful sizes and shapes available. Imported; made from finest English steel. The file teeth are maximum hardness without brittleness. Each file is double-ended for double the life. Great tools for tool and die makers, jewelers, engravers, model makers, etc. **Set of 6 No. 41,945 $13.25 Ppd.**

ELECTRICAL ITEMS

Surplus 1.2v Ni-CD Cells . . . at Bargain Prices



Fraction of original cost. Group several together to build a battery with any voltage. Reliable cells have long life and are inexpensive to use. No corrosive fumes. Store indefinitely wet, dry, charged, discharged, open or short circuited. Rechargeable; almost 100% output at temperatures below freezing; withstand shock and vibration; vented for safety during fast charging and discharging; approx. half the weight of comparable lead-acid batteries. Hundreds of uses in industry, labs, school and home; also for most electrical devices that draw high current (model airplanes and cars, electric motors, rechargeable lanterns, aircraft radios, and boat lights). Instr. incl.

34 amp/hr 9-1/2x3-1/8x1-1/8x1-3/8" **No. 41,735 $10.00 Ppd.**

20 amp/hr 8-1/4x3-3/16x1-1/16" **No. 41,736 $9.00 Ppd.**

Save Twice! Build a 6v Battery Charger

Kit assembles into 6v battery charger (6-1/8 x 6-1/8 x 2-1/8"). Attaches to battery case for a complete 6v DC power supply. Charges above in 1 hour. Regulated, transistorized circuit shuts off at full charge. Incl. instr. **No. 70,807 $8.00 Ppd.**

Batteries Dead? Flashlight doesn't light? Toy car won't run? Imported Battery Testor shows condition of any "D", "C", or penlight 1.5v cells and 9v transistor radio battery. Compact (2 x 4½ x 1¾") device uses no clips, wires, or light attachments. Meter tells you whether it's good, weak, or should be replaced. **No. 60,812 $5.00 Ppd.**

Surplus Telephone Generator Built For Signal Corps For $15.00 . . . Our Price $8.50

Available again! This war surplus generator, originally intended for use in a field telephone, opens up unlimited possibilities for experiment. Just by turning crank you generate over 100v for classroom experiments, to demonstrate uses of electricity, to ring a telephone bell or to charge the ground and bring night crawlers up for fishing bait. Generator is 3-1/8 x 4-1/8" long. Suggested experiments incl. Generator shipped may be somewhat different in appearance to that illustrated, but it will function identically.

No. 50,225 $8.50 Ppd.

"Trickle" Charge For 1-10 Ni-Cd Cells

Recharges 1 to 10 Ni-Cd cells (1.2 to 12v) at any rate from 10 to 250 milliamperes. Just select desired ma charge, read proper setting on chart, and set dial. Excellent for all rechargeable cells. Bakelite case 2 x 3¾ x 6¼"; wt. 3 lb. Pilot light, 5-ft. cord, instructions. **No. 70,812 $12.95 Ppd.**

Battery Holder

Used by Army for illuminating optical instruments. Operates from 2 "D" cells (not incl.) Has a rheostat to vary illumination or speed and clips for attaching to small motors, etc. Gov't. cost $15.00 **No. 60,202 $3.85 Ppd.**

Ultrasonic Cleaners For Home And Industrial Use

Ultrasonic cleaners provide the most efficient method for cleaning small delicate parts of infinite variety. Everyday items like jewelry, watchbands, combs, paint brushes, coins, and dentures; more intricate items such as industrial parts, draftsmen's and artists' pens, lab and medical instruments, small fossils, etc. Items and parts are "blasted" in the tank's cleaning fluid by countless bubbles and waves produced by high-frequency alternating current converted to mechanical energy, at least 80,000 vibrations per second. These waves and bubbles penetrate cracks and spaces inaccessible to other methods, yet the action is so gentle delicate items can be cleaned without fear of damage. Although the method is inaudible to the human ear, its results are quite visible to the human eye.

3-Oz. Capacity Model

Clean small, delicate, intricate items with this low-priced 3-oz. capacity cleaner. 2¼" I.D. x 1½" deep, stainless steel cup. Ideal for cleaning jewelry, pen nibs, mechanical drawing pens, coins, brushes, etc. Useful around home, shop assembly area, lab, art and drafting room, jewelry store, etc. Solid state; all metal; 115v AC: 12 watts. 6-ft. cord with in-line On/Off switch. Height: 3¾". Incl. tweezers; brush; 3 different sample packets of cleaning powder U.L. approved. Instr. **No. 41,373 $29.95 Ppd.**

1 Pint Capacity– 3 Times More For The Money

New full pint model but same low price as old ⅓ pt. capacity model. Handle delicate cleaning from diamonds to dentures. 6 x 4 x 4" all metal and stainless steel cabinet with built-in tank. Has: frequency control; item platform; cleaning powder; lid; pilot light; completely transistorized; mfgr's 1-year guarantee. 120v A.C. **No. 71,003 $55.50 Ppd.**

Large Capacity Models For Lab and Industrial Use

Clean larger intricate items and also many items at once. Great for medical labs, jewelers, camera repair shops, etc. Feature a baked enamel or vinyl finish and one-knob control. All have stainless steel tanks and operate on 105-125v AC.

1¼-Quart Capacity (illus.). Inside dimensions: 5-3/8 x 5-3/8 x 3". 30 watt; unit measures: 5-7/8 x 5-7/8 x 7½". Also features a stainless steel tank cover. Wt. 4½ lb. **No. 71,198 $89.95 Ppd.**

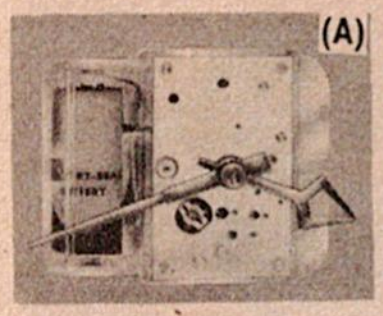
½-Gallon Capacity. Inside dimensions: 5-3/8 x 5-7/8 x 4". 80 watt; unit measures: 8¾ x 6-7/8 x 6-3/8". Shpg. wt. 28 lb. **No. 85,126 $159.95 T.C.C.**

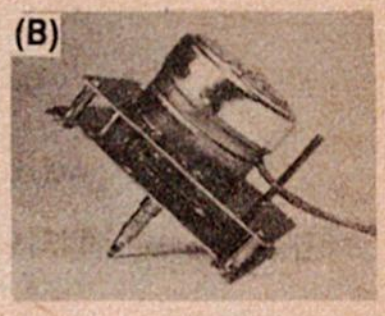
1½-Gallon Capacity Deluxe Model. Inside dimensions: 12 x 6 x 6". 120 watt; unit measures: 13½ x 9 x 6½". Shpg. wt. 33 lb.

No. 85,128 $274.95 T.C.C.

MOST OF OUR PRICES INCLUDE POSTAGE.

Build Your Own Clocks



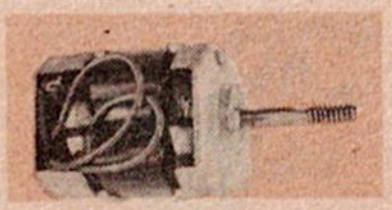


(A) Transistorized Clock Movement operates for months on just one "C" flashlight battery (not incl.). Build or update any clock with this fine kit. Also used to power instruments. Jeweled bearings reduce friction and give movement extra long life—balance wheel runs in V-type jewels; escape wheel pivots in hole jewel. Complete with fit-up nut, washers, two sets of hands—modern gold with 2¾" minute hand; ornate black with 3¾" minute hand. Overall 7/8" deep x 2¾" wide x 3-1/8" high. American made. **No. 60,516 $13.95 Ppd.**

(B) 220v Synchron® Clock Motor designed and built for sustained accuracy . . . from small clocks to display clocks up to 26" in dia. under glass. Electrically powered from 220v, 50Hz cycle outlet. Pulls up to 30 in. oz. at 1 rpm. Split-second accuracy, long-wearing construction, never needs oiling. Operates well mounted in any position. 4-hole mtg. Solid brass; two 6" leads, no face or hands. **No. 41,810 $7.00 Ppd.**

SURPLUS MOTORS GALORE . . . BARGAIN PRICES

AC-DC Varispeed Motor



Surplus, look new. Up to 17,000 rpm no load, CCW rotation, instr. for CW. Oilless bearings, shaft 5/16" dia. Case 2½ dia. x 3½" plus 1¾" long shaft with 1" worm thread. **No. 60,653 $4.00 Ppd.**

Miniature DC Motors With Pulleys

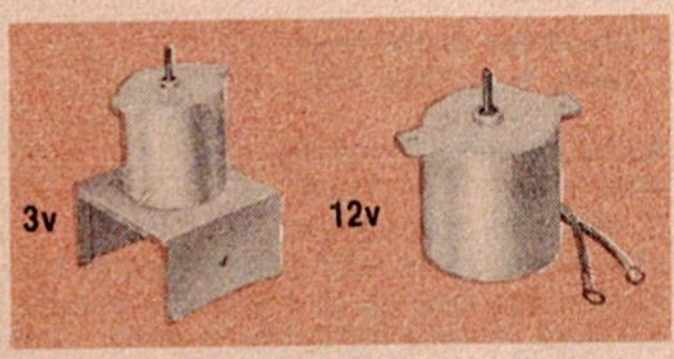
High quality electric motors that are perfect for science projects, experimenters, and research. Permanent magnet type with bronze bearings. High torque for their size: 6 in. oz.; 12v DC; 1.5 amp stall current. 8,000 rpm nominal. Approx. 1-7/8 x 7/8" dia. Mounting flange and instr. incl.

Pkg. of 3 **No. P-41,752 $2.75 Ppd.**
Pkg. of 12 **No. P-41,751 $9.50 Ppd.**

DC Motor With Gear Train

Permanent magnet type motor has copper brushes and commutator. Operates on 1.5-3 volts. Reduction ratio of gear train is 300:1. .117" dia. output shaft—10rpm at 1.5 volts, 20rpm at 3.0 volts. 2 leads, one soldered to copper contact, one loose. Cadmium plated housing 7-5/8 x 2-1/16" upper face. 5½ x 1-3/16" lower face has 2 mounting flanges. Provide rotational power for any low speed device with moderate loading (like electric trains). **No. P-60,989 2 for $2.25 Ppd.**

High Torque Variable Speed DC Motors

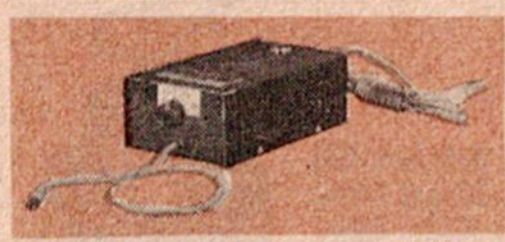


Reversible, gear train, low current drain, self-starting motors with built-in speed reduction gears, for Visual Effect Projectors, hobby, and commercial use. U.S. made, quiet, long life (rated 7,000 hrs.). Tough plastic case 1-13/16", dia. x 1-13/16" plus 1/8" dia. x 11/16" long shaft; panel mounting. 3v motors have twist-on battery case for 2 "D" cells. 12v motors have 6" leads. Approx. operating currents: 10ma for 3v, 4ma for 12v motors. **Each $6.50 Ppd.**

Speed (rpm)	Stall Torque (in.-oz.)	Stock No. (3 volt)	Stock No. (12 volt)
1	65	**41,327**	**41,860**
2	31	**41,861**	**41,331**
7	12	**41,862**	**41,863**
16	5	**41,864**	**41,865**
30	2.4	**41,329**	**41,333**
115	.8	**41,866**	**41,867**

Surplus 3v Bargain: 60rpm, 11ma, 8 in-oz. torque. **No. 71,702 $4.25 Ppd.**

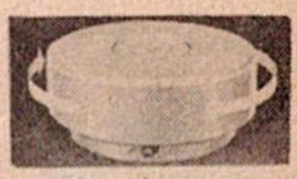
3 To 12v DC Power Supply For Motors, Radios, Etc.



AC Converter powers most Japanese, solid-state electrical devices with jack for external AC adapter. 12" output cord equipped w/center-positive, coaxial plug (5.5mm O.D.; 2.5mm I.D.; 9.5mm deep). Measure before ordering! Cut off plug to power small DC motors, charge Ni-Cd batteries, etc. Input: 117v AC. Output: 3, 4.5, 6, 7.5, 9, & 12v all at approx. 750 ma. Output varies with load. Metal; 5½ x 3 x 1-7/8". **No. 60,828 $11.95 Ppd.**

Variable Speed Control Kit with reversing switch for use with DC 12v motors (left). Use with any 12v source, or No. 60,828 (above). Instr. **No. 41,550 $3.85 Ppd.**

4 RPM Display Turntables



Clockwise rotation. Polypropylene, 8" dia. x 3-3/16" high **DC Turntable** incl. 2 "D" batteries. Good where cord detracts. **No. 70,412 $9.75 Ppd.**
110v AC Turntable **No. 71,293 $10.25 Ppd.**

Low-Priced DC Power Supply

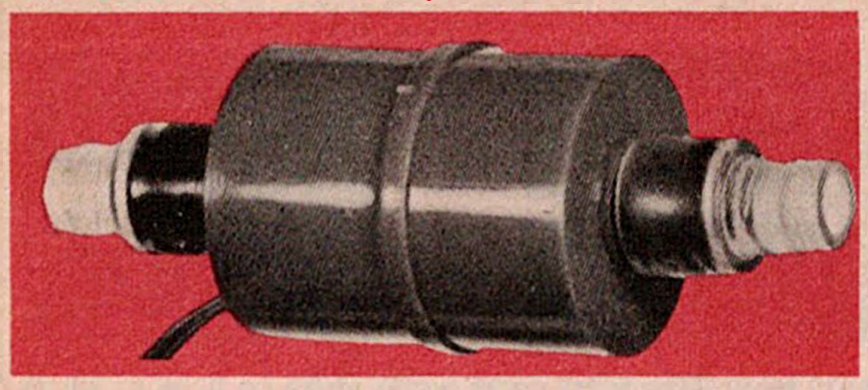
Manufacturer's surplus! Originally designed for toy slot cars, makes an excellent power supply for experimenters. Suitable for running motors, lights, solenoids, and charging batteries. Input: 115v AC; output; 14v D.C., 0.8 amp. continuous duty (1 amp intermittent), full wave, solid state rectified DC power supply. For electronic, relay, or other special uses, just add an electrolyte capacitor to the output terminals for "filter" (instr. incl.). Air-cooled base. 2¼ x 3¾ x 5". Imported. **No. 71,581 $3.95 Ppd.**

Variable Output DC Power Supply
Similar to above but output adjustable from 0-19v. 200ma rated current; 0.01v max. ripple. Good for hobbyists, experimenters, etc. Use to operate small motors, electronic circuits, charge Ni-Cd cells, power small lamps, etc. **No. 71,605 $12.50 Ppd**

Vari-Volt Control . . . For Lights, Power Tools.

Stepless control of lamps and heaters to 1,000 watts; motors to ⅓ hp. for industry, workshops, etc. 3-prong, grounding-type receptacle and plug for safe operation. Fuse protected. For 110v, 7 amp. Heavy-duty plastic body 2 x 3¾ x 6¼". **No. 70,666 $24.50 Ppd.**

Best Submersible Pump We've Tested



- **Operates UNDERWATER on 12 to 20v AC**
- **LIFTS 1 PINT PER MINUTE at 12″ head (on 20v)**
- **PUMPS FOUNTAIN-LIKE STREAM OVER 30″ HIGH (on 20v) with recommended 3/64″ nozzle**

Miniature electromagnetic, reciprocating pump excellent for science classes, student projects, exhibits, mini-waterfalls & fountains. Sturdily built for long, trouble-free operation. Operates at peak efficiency with low-cost bell or train transformer (not incl.). Plastic case 2½" long x 1" dia. Complete with spare valve and spring, instr. Imported. Wt. only 1¼ oz. (Not recommended for use in salt water.) **No. 60,307 $4.98 Ppd.**

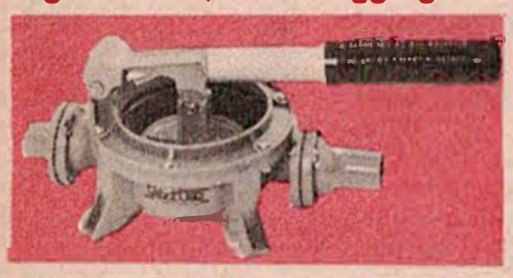
Pump Accessory Kit supplies most of the accessories needed to adapt Pump No. 60,307 for various projects. Includes rectangular water container, (holds approx. 1½ pints), hose couplings, tees, jet nozzles, 6½ ft. (1/8" I.D.) and approx. 2 ft. (¼" O.D.) clear plastic tubing.
No. 70,936 $4.75 Ppd.

The "Geyser"...

A Portable Submersible Centrifugal Pump

Weighs just 8½ lb., but delivers big pump performance from 20 gal./min. 3-ft. high to 5 gal./min. 20-ft. high. Safe, noiseless, perfect for emptying pools & fishponds, draining flooded basements & boats, and even powering waterfalls and fountains. Features: screened bottom inlet pumps clean to 1/8" of floor; ease of use with garden hose or 1" pipe; 10,000 hr. sealed in oil 1/6 hp motor; automatic overload protection; non-corrosive metal construction (safe in salt water); water resistant 8-ft. grounded cord & plug. Overall size: 9¼ x 6½" dia. U. L. listed. Instr. incl. 1 yr. mfg. warranty. **No. 71,787 $46.75 Ppd.**

High Volume, Non Clogging Guzzler Hand Pump



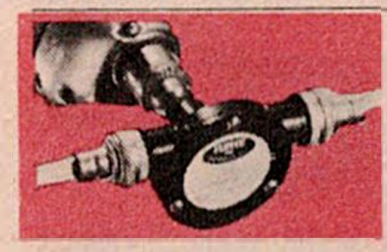
Solve all your pumping problems where there's no electricity available with the handy Guzzler. Ideal for bilges, holds, and sumps on boats and many jobs on construction sites. Self-priming, 15-ft. suction lift, 12 g.p.m. capacity, 7 strokes per gal., and ¾" I.D. inlet and outlet. Small stones, matches, sea weed, slurrys and other objects pass right through. Unharmed by many oils, fuels, solvents, and detergents due to its Delrin construction. Alum. handle, rugged rubber diaphragm and valves, uses any 1" hose. Compact 10x5x4"; wt. 1¼ lb.lb. **No. 71,784 $30.90 Ppd.**

Unique Pump For Fountain.

No separate input and output operations. Turn any medium size bowl or container into a table-top fountain with this cleverly designed pump. Quietly pumps 30 gph up to 10", or runs trickle up to 20" high. Only one moving part, a plunger completely surrounded by water. 3¾" high x 1¾" dia. Imported. 115v AC. Instr. **No. 60,803 $18.25 Ppd.**
3-Tier Fountainhead for above. No. 71,225 $12.00 Ppd.

Complete Liquid Handling System Instant Self Priming! Pumps Up To 350 G.P.H.!

For home, cabin, farm, shop! Drain basements, aquariums, boats; fill tanks; transfer liquids. Noncorrosive pump lifts water 20 ft., pushes it 50 ft. Handles most liquids (not gasoline); brass connections fit garden hose & ½" pipe; stainless steel wear plates; one moving part. Incl.: pump, hi-torque, enclosed motor (115v AC) with thermal overload protection; 6-ft. grounded cord; two 6-ft. hoses; brass strainer; instr. 3½ x 4½ x 7¼".
No. 71,440 $39.95 Ppd.
As Above but 12v DC No. 71,751 $43.75 Ppd.
Suction Strainer for any suction pump. Picks up water to within 1/16" of flat surface. **No. 71,441 $3.49 Ppd.**



Self-Priming Pump . . .

Pumps water, lubricants & other liquids with your electric drill (2,000 rpm ¼" drill motor) as power source. Oil resistant, good for kerosene, mild abrasives & liquids with solid matter. Economical pump (4½ x 2½") handles 200 gph at temp. 40-180°F. Uses drill chuck & garden hose. Self-priming to 8-10 ft. vert.; 25 ft. horiz. through hose. **No. 71,394 $5.95 Ppd.**

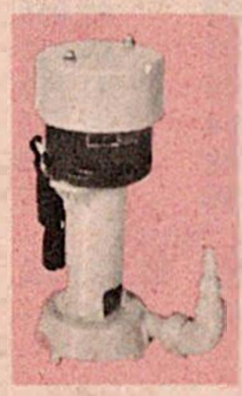
Miniature Pump

Operated From Two Flashlight Batteries

- **7½ gallons per hour**
- **Perfect for the photo darkroom**
- **Ideal for table fountains, waterfalls, etc.**

Miniature (1¾ x 2-5/8") electric motor and pump is ideal for schools and club experiments. With base placed in liquid, it pumps a continuous flow up to 1 pint per minute through tube 12" high (4" tube incl.). Use in either direction. Impeller more efficient when rotating counter-clockwise. Self priming. With 2 flashlight batteries in series, it pumps liquids to a height of 24' (not a 24" high stream). Runs for 48 hours on one battery. Not convertible to AC-DC.

Can be used in many ways including: circulation of darkroom chemicals, table fountains and displays, model waterfalls, hydroelectric installation, water filtration and aeration for fish tanks, flow models of circulatory systems, automatic plant watering units, humidifiers, etc. **No. 50,345 $2.25 Ppd.**
Battery Holder. Ideal for use with above. See p. 130.



Vertical High Capacity Pump

Compact, general-use pump. Plastic-cased, evaporative type pumps 300 gal./hr. 1 ft. high or 210, 5 ft. For evaporative coolers, acid, alkali pumps; no seals. 3.7 lb. psi max. 115v AC, 60 cycles. Air-cooled motor; hose adapter; remov. base. Ht.: 8-13/16"; 4½" dia. 3 ft. cord (no plug). Wt. 2.14 lb. Part submersible. **No. 71,599 $13.95 Ppd.**

Submersible Pump With Automatic Shut-Off

Pumps water up to 4-ft. high at rate of 75 gal./hr. Shuts off automatically if accidentally runs dry. Epoxy-sealed motor with overload protection device and 6-ft., 3-wire cord. 110v, 60-cycle, 3½ x 2½ x 1½" overall.
No. 71,227 $31.50 Ppd.

MAKE A FLUORESCENT FOUNTAIN, SEE PAGE 112.

Precision Pyrometer

Calibrated for type K Chromel-Alumel thermocouples (No. 40,478 below); also used as a millivoltmeter. Features spring backed jewel bearings, non-magnetic pivots, zero adjusting screw; may be panel mounted. 4.58 x 4". 3 scale-ranges 32-2500°F, 0-1370°C (type K thermocouple), 0-55mv DC. Accuracy within ±2% of temp. reading; for short thermocouple lengths. Conversion charts; instr. **No. 70,408 $34.95 Ppd.**

Thermocouple for temperature measurement from 0-2400°F. 17" long; 14-gauge. Chromel-Alumel wire. Six 1" insulators protect hot end. Has insulated, color-coded leads. **No. 40,478 $7.00 Ppd.**

DC Ammeter & DC Voltmeter

0-10 amps; 0-10 volts. Ammeter has internal resistance of 0.0012 ohms; voltmeter resistance 100 ohms/volt. Each 2¼" sq. Mounting hardware incl.

Ammeter No. 60,158 $4.00 Ppd.
Voltmeter No. 60,159 $4.95 Ppd.

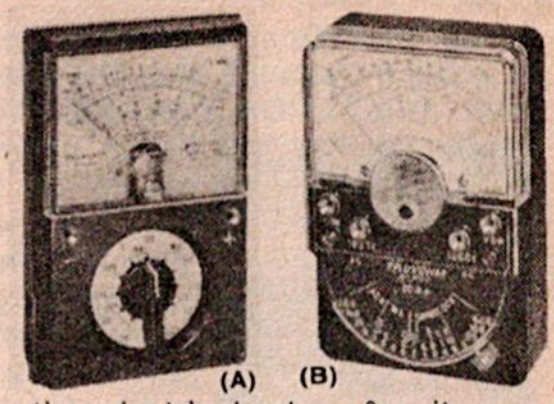
Solenoid 24v AC

Stepdown Transformer

110-120v AC, 60 cycles. 11v AC with light load. 1½ x 2 x 3¼".

No. 60,258 $2.25 Ppd.
No. 41,138 $1.25 Ppd.

Low-Cost Multimeters



Lightweight, pocket-size, volt-ohm-milliammeters for busy technician/hobbyists. Really compact units with professional versatility & performance, ideal for testing electrical values & units.

(A) 11 Range. DC: 0-10, 50, 250, 1000v; AC: 0-10, 50, 250, 1000v; DC current, 0-1, 100MA; resistance, 0-150,000 ohms. Accuracy: 2% meter movement; sensitivity: 1,000 ohms/volt, AC & DC. 1-1/8 x 2-3/16 x 3-5/8". Battery incl. **No. 71,739 $9.25 Ppd.**

(B) 18 Range. DC: 0-5, 25, 100, 500, 1000v at 20,000 ohms/volt; AC: 0-5, 25, 100, 500 1000v at 10,000 ohms/volt; DC current, 0-5MA, 0-5, 50, 500 MA; resistance, 0-6, 0-600 Kohms, 0-6, 0-60 Mohms. 1¼ x 3 x 4-5/8". 2 batteries & case. **No. 71,740 $21.75 Ppd.**

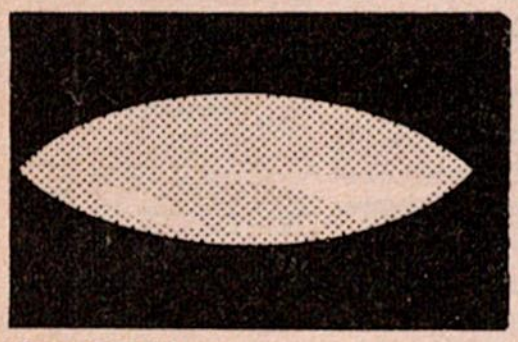
AC Hour Meter

Resets at 99,999.9! Determine operating costs of compressors, projectors, etc. Self-enclosed plastic case (2¾ x 3-5/8") w/3 holes. White numerals. Synchronous motor drive. 115v AC, 60 cycles. (2) 8" leads. U. L. listed. **No. 41,442 $12.60 Ppd.**

INSTRUMENT COMPONENTS

Items offered here are available in large continuing supply for manufacturers. If you require these in larger quantities, please write for special prices. Other OEM items throughout the catalog.

Attention: Manufacturers! Hobby Groups!

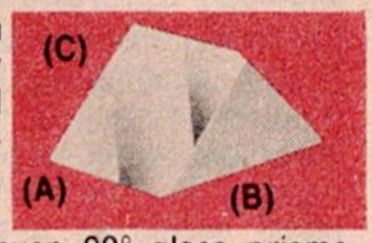


Double Convex Lenses At Surplus Bargains

14mm dia. x 48mm F.L. double convex lenses for instruments, science projects, testing labs, etc. Slight seconds, but perfectly useable.

One DCX lens No. 94,270 50¢ Ppd.
Pkg. of 100 No. P-41,769 $35.00 Ppd.
Pkg. of 1,000 No. P-41,770 $250.00 Ppd.
Pkg. of 10,000 (allow 3 weeks for delivery) **No. P-85,801 $2,000.00 Ppd.**

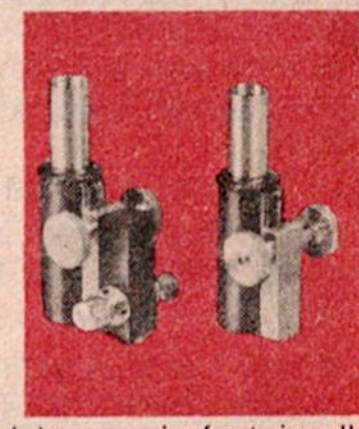
90° Glass Prism Bargains in Stock



Industrially, right angle prisms in standard sizes are frequently sought by manufacturers, and for replacement purposes in optical tools, shop instruments, etc. To answer repeated demands, we are stocking a supply of eleven 90° glass prisms, optically ground and polished in sizes from ¼" to 3". Low, realistic prices. Accurate dimensions.

Stock No.	Price Ppd.	Size in Inches B	C	A
30,575	$ 2.50	5/16	1/4	1/4
30,576	3.50	21/32	1/2	1/2
3301	5.50	7/8	5/8	5/8
30,577	5.75	1-1/32	3/4	3/4
40,995	6.25	1-13/32	1	1
30,632	9.75	1-19/32	1-1/8	1-1/8
41,002	10.75	1-3/4	1-1/4	1-1/4
41,003	17.25	2-3/32	1-1/2	1-1/2
41,004	30.26	2-13/16	2	2
60,649	52.50	3-1/2	2-1/2	2-1/2
60,650	108.50	4-3/8	3	3

Microscope Focusing Tubes



Top Quality . . . Low Priced . . . Super Smooth

Hard-to-find microscope bodies for specialized mounting. Built to international standards for microscope optics. Many uses: optical bench assembly; special microscopes & telescopes; observe micromachining operations; in electronics, inspect & check circuit boards; in research labs . . . in fact, in all areas of scientific research & technology. Features high precision plated brass helical rack & steel pinion focusing (70mm travel) coarse focus. Flat, brass base approx. 1 x 3", easily drilled & tapped for mounting. Eyepiece tube takes all .917" dia. standard eyepieces (incl. our #60,270 zoom eyepiece, #41,100 microscope camera adapter & new #1619 Polaroid® instrument camera), & standard microscope objectives.

(A) Fine/Coarse Focusing Tube: 3mm fine focusing travel; both coarse & fine focusing; 6¼" long x 3-3/16" high x 3-1/16" wide. Wt. 2.8-lb. **No. 71,525 $84.95 Ppd.**

(B) Coarse Focusing Tube: 6¼" long x 2¾" high x 2¾" max. width. Wt. 1.4-lb. **No. 71,524 $59.50 Ppd.**

Focusing Instrument Eyepieces

Individual focusing Kellner eyepieces with diopter markings. Suitable for optical instruments (i.e. telescopes) or as replacement eyepieces for binoculars. Barrels threaded extrenally for mounting eyepiece & internally for filters, etc. Retractable rubber eyeguards.

Type F.L.	Ext. Thread	Int. Thread	No.	Price
6X30 21.5mm	23x.60mm	**20.6x.60mm**	41,394	$6.25
7X50 27mm	29x.60mm	**26.2x.60mm**	41,675	$6.25

Adapt above to standard 1¼" O.D. Screw-on.
6X30 **No. 41,614 $2.50** 7X50 **No. 41,741 $2.75**

PROTECTIVE DEVICES

Protect Your Possessions:

Scribe Your Drivers License No. On TV's, Stereos, Bicycles & Cameras With The Electric Engraver JOIN "OPERATION IDENTIFICATION"

Police departments all over the country are urging people to engrave their valuables and register them with the police to help discourage burglers. Once the items are engraved, thieves are reluctant to take them because they can't plead convincingly that marked items are their own and fences don't like to handle identifiable merchandise (i.e. marked with driver's license or social security numbers). Long-life carbide tip Electric Engraver is easy to use and has a control knob to adjust depth and width of cut. Engraves into metal, glass, plastic, wood, steel, and most hard surfaces. Kit also includes: 2 pressure-sensitive window stickers to indicate you are a member of "Operation Indentification" (these may discourage a thief from breaking in at all); 10 "Stop Thief" labels to place on the items engraved; and complete instructions. **No. 60,971 $9.95 Ppd.**

Replacement Carbide Tip **No. 41,943 $2.50 Ppd.**

Signaling Mat for concealment under rugs anywhere. Actuated by 5 lb. pressure at any point. Switching elements sealed in sheets of tough vinyl. Safe low voltage operation. 23 x 17 x 3/32". Incl. 6-ft. leads; instr. (Use with Relay No. 41,148) **No. 70,588 $14.00 Ppd.**

Sensitive AC Isolation Relay converts 95-125v AC to safe low voltage. Unit, 2-1/8 x 1¾ x 1¼", consumes under 40 ma. Handles max. load of 5 amp at 117v. Over 10,000 operations. Wt. 6 oz. Polethylene cover, 5 color-coded 6" leads, instr. **No. 41,148 $4.00 Ppd.**

Observ-O-Scope

Observe callers without being seen. Wide field (175°) of vision for extra protection. Unobtrusive. Optics give clear sharp image. Easily mounted. Fits doors from ¾ to 2¼" thick. **No. 40,582 $3.30 Ppd.**

10" Dia. Vibrating Bell so loud it can be heard down the block! Weatherproof box, 6¼ x 5¼ x 2", w/2 mounting holes. 120v AC; 0.09 amps. Total bell depth 5½". Shpg Wt. 7 lb. 14 oz. **No. 71,044 $35.75 Ppd.**

Water Level Alarm . . . Sensitive, Economical

Low-cost electronic home and business alarm warns about internal flood damage caused by clogged sump pumps, broken pipes, or excessive rain. Safe, reliable, so sensitive a moist finger on sensor sets off buzzer. Plugs in any 115v AC outlet. Up to 50 sensors work on one Power Unit! Isolation transformer; solid state circuitry. Metal Power Unit 2¼ x 2½ x 4"; Sensor 2¾ x 7/8" dia. with 20-ft. wire; and detailed instr. incl. Wt. 1.5 lb. Also use to set water levels, etc. **No. 41,609 $19.95 Ppd.**

Sensors with 20-ft. wire. **No. 41,610 $8.95 Ppd.**

Ultrasonic Device Senses Burglar Automatically!

Protect your property economically (runs on pennies a month) & effortlessly with the Ultrasonic Silent Sensing Device. Just plug Sensor into outlet & plug light and/or alarm directly into back. It turns on light or alarm or both when it "hears" someone enter room, continues a full 2 min. after person leaves, then shuts off automatically & awaits another intrusion. Preset for ultra sensitivity & max. distance (15-30 ft. depending on room shape). Ultrasonic frequency: 35 KHz. On-off switch; built-in timer; variable sensitivity control. Output: 110-130v at 5 amp. Power required: 110-130v, 60 HzAC. Attractive walnut finish. 3¼ x 3¼ x 10-3/8".

No. 71,283 $69.95 Ppd.

Intrusion Alarm Horn (for above). Plugged into Sensor, shrill intermittent blasts overwhelm thief. 3¼ x 3¼ x 3¾". 110v AC. **No. 71,572 $29.50 Ppd.**

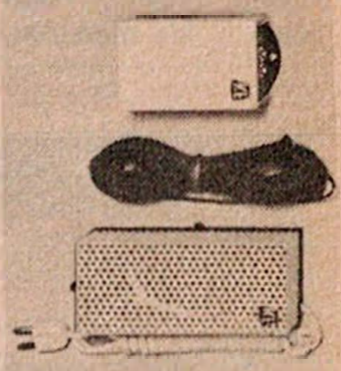
Warning Decals

Put this decal on your window: whether you're burglar alarm equipped or not is unimportant as long as potential burglars think you might be. 3 x 3½" water-applied decals discourage thefts in homes, businesses, boats, autos. Warnings boldly printed in red on yellow, shield-shaped background.

Package of 10 **No. P-41,276 $2.00 Ppd.**

Package of 40 **No. P-41,277 $5.00 Ppd.**

Sensitive All-Purpose Alarm

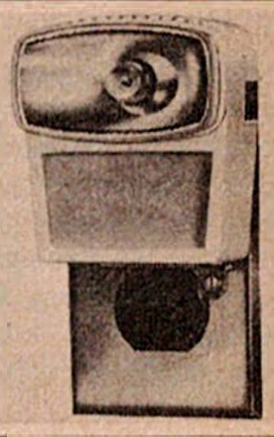


- **Detect Fumes, Gas, Fire, Smoke**
- **Protect Family, Home, Office**

It signals presence of noxious, poisonous or explosive fumes, gas, fire, smoke, etc. long before more dangerous conditions occur. Detects escaping cooking gas from a blown-out pilot, fuel oil & gas leaks, and even a potential house fire before flames or smoke appear. It features a thermostatic heat detector, gas sensor & non-sparking buzzer. Low cost, uses no more electricity than an electric clock. Ideal for anywhere people live or work! Plugs into any 115v AC outlet. Solid state circuitry. Easy to install. Main unit, buzzer alarm, 40-ft. wire, and instructions incl. 5½ x 2½ x 2". **No. 71,633 $37.75 Ppd.**

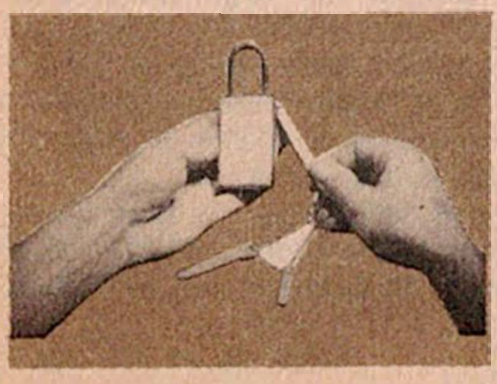
Standby Emergency Light

For home, school & office



Does 3 valuable jobs in the home. If power fails, it goes on automatically. Use as rechargeable flashlight too. Electro-luminescent panel serves as a night light. Plugs directly into socket. Approximately 1½ x 3 x 3½". **No. 60,276 $17.25 Ppd.**

Pickproof Magnetic Lock With No Keyhole . . . Protect Valuables ● Amazing Operation

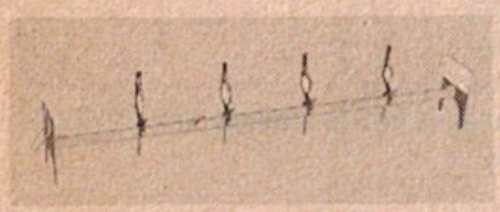


This could be the most significant advance in locks in the past 100 years. New magnetic lock has a series of internal magnets and quick-use magnetic "key". There's no keyhole so its pickproof and no dirt or moisture can enter to cause sticking. To open in a second, just place "key" in the slight depression on the lock's side. No other magnet or magnetic key can activate the mechanism because each has its own unique magnetic combination. And it's pretty too . . . bright gold finish, heavy-duty construction. Nice enough for a gift; but strong enough to prevent theft of locked valuables. Includes 2 "keys", chain, plastic case and instructions. Magnetic qualities guaranteed for 100 years. (Who's going to live that long?) 3¾ x 1½ x 9/16" overall; wt. 8 oz. **No. 42,017 $9.50 Ppd.**

OPTICAL HEADQUARTERS U. S. A. . . . ALL ITEMS IN STOCK

We carry more lenses, prisms, mirrors, and other optics in stock than any other company. Choose from bargain-price war surplus, choice imports from Japan and Germany, manufacturers' overruns and slight rejects, etc. At many colleges, research labs, and major companies, the standing policy is "Try Edmund first before wasting a lot of time and money having it made!"

Low-Cost Optical Bench . . . Only $19.95



- **Measure focal length**
- **Use as collimator**

Optical benches built for research labs are usually costly. This economy model was designed to fill the average needs of schools, hobbyists, camera stores, small labs, etc. Basically, it's a 1 meter (40") heavy-duty hardwood rule (graduated millimeters and inches) with two adjustable metal ends (one reticle plate and one first surface mirror plate). It includes 4 V-shaped lens holders with spring clamps and thumb nuts . . . which adjust horizontally and vertically. Use to check image quality, position lens elements, teach optics, etc. Includes instructions. **No. 80,064 $19.95 Ppd.**

Extra Lens Holder w/Clamp No. 60,069 $3.25 Ppd.

For Deluxe Optical Bench, see page 154.

"The Optical Bench" . . . Edmund & Brown

A guide to homemade optical benches . . . simple to sophisticated. Handy reference for basic optics; covers lens F. L. relationship to optical benches, etc. 36pp.(8½ x 11"); incl. diagrams, tables, etc. **No. 9085 90¢ Ppd.**

Optical Black & White Paints

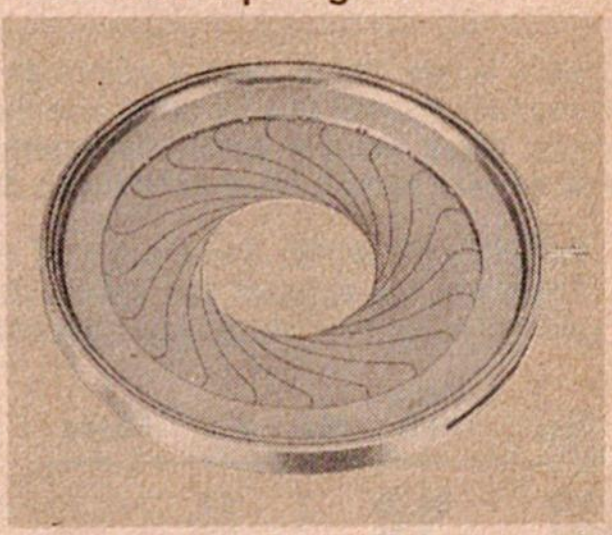
New velvet-finish enamels in 6-oz. spray cans for primed metal or wood. Black makes perfect light absorbing and diffusing surface for interiors of telescopes, cameras and other optical equipment, darkrooms, etc. White uniformly scatters incident light from any angle.

Black. **No. 60,608 $3.25 Ppd.**

White. **No. 60,609 $3.25 Ppd.**

Complete Optics Laboratory, see page 2.
Experimental Optics Kit, see page 90.

Precision, Low-Cost Iris Diaphragms

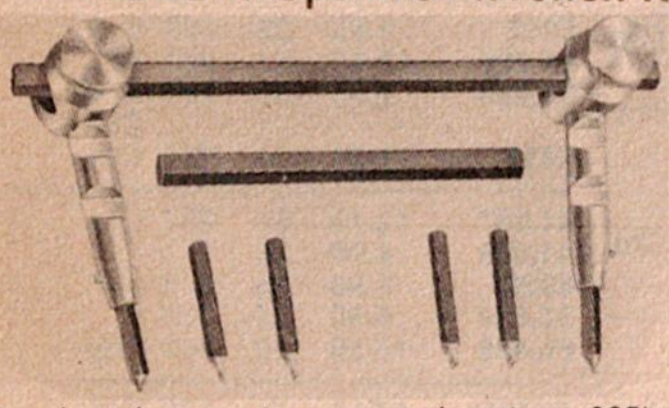


This series of eight, German-made iris diaphragms covers the most commonly required sizes. No. 30,263 is a hard-to-find miniature, Nos. 40,997 and 40,998 each have a threaded shoulder (to attach to a microscope substage) and a swing-in filter holder below the iris. These diaphragms, designed for instrument use, can be attached to cameras, enlargers, projectors, illuminators, etc., wherever a variable aperture is necessary. Precision built, lever operated, iris leaves are made of blued spring steel. They operate exceptionally smoothly in black-finished, lightweight, aluminum mounts.

Outside Dia.	Aperture Max.	Aperture Min.	Thick.	Stock No.	Price Ppd.
25/32"	15/32"	3/64"	13/64"	30,263*	$ 8.25
1-21/32"	63/64"	3/64"	19/64"	40,997*	12.00
1-57/64"	1-3/16"	3/64"	19/64"	40,998*	12.75
2¼"	1-5/8"	1/8"	17/64"	30,118*	13.25
3-15/16"	2-61/64"	5/32"	23/64"	30,264*	32.50
5-29/32"	4-21/64"	15/64"	33/64"	60,644*	65.00
8-3/16"	6-7/32"	9/32"	5/8"	70,894*	109.00
11-13/16"	8-55/64"	25/64"	3/4"	70,895*	133.50

*Above bargains are imported from our German source & are in heavy demand. Delays of 60-90 days sometimes occur. If immediate delivery is needed, see more expensive iris diaphragms on page 15.

Edmund Spanner Wrench Removes Retaining Rings Quickly Without Damage



Vital tool for work with optical instruments, aerial lenses, telescopes, etc . . . anywhere the removal and replacement of threaded retaining caps is required, on production lines, in repair shops, and in camera and optical-goods stores. Fully adjustable for ½-7" diameter retaining rings . . . even greater diameter-rings with longer bars. Hex-bodied tips slip into hex-hollowed arms and lock securely with set screws. Will not rotate. Aluminum bodies with locking knobs that hold aluminum arms in vise-like grip against bar. 2 sets of adjustable legs 3½" and 7" long permit extension of tips from 1½-3" below wrench body. Wrench includes 2 high-tensile steel hex bars, 3½" & 7" long (3/8" across flats), 3 pairs of general purpose tips, two .025" thick (flat), two .062" thick (flat), two .062" dia. (pin-type) and instructions. **No. 70,751 $15.50 Ppd.**

EDMUND'S FAMOUS LENS KITS For Hobby, Experiment, Classroom Use

The glass lenses in these fascinating kits are worth many times the price. Since the edges are slightly chipped, we offer them at these low prices. They are of good optical quality and ideal for classroom, scout projects, hobbycrafts, and experiments.

10 Lens Kit

You can easily make a 4.4X Galilean Telescope, 12.4X Astro Telescope, 3X Double Lens Magnifier, 5X and 14X Pocket Magnifiers, 40X Microscope, 35mm. Slide Viewer and other useful instruments. 16-page instruction booklet. **Kit No. 2 $2.50 Ppd.**

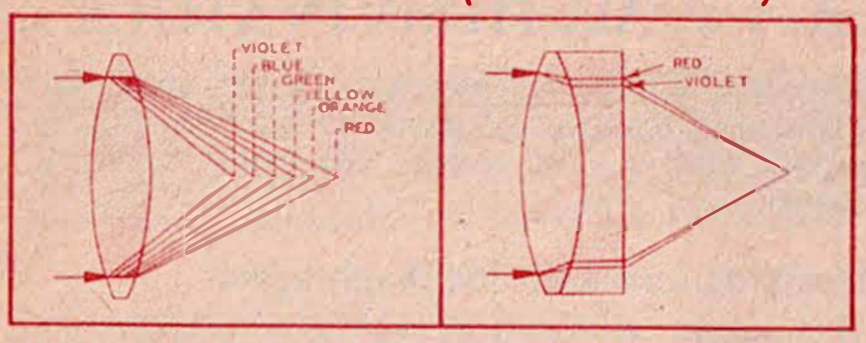
40 Lens Kit

Larger, more versatile kit: 40 lenses, all marked with individual specifications. Greater variety allows more advanced experimentation. Make all instruments in Kit No. 2 plus many more of your choice. 16-page instr. booklet. **Kit No. 5 $8.50 Ppd.**

70 Lens Kit

Extra large assortment of 70 lenses identified by type, F.L., and dia. We recommend this kit for classroom, optical lab, and advance amateurs. Includes 32 page "Fun With Optics." **Kit No. 10 $12.95 Ppd.**

Achromatic Lenses (Color Corrected)



Simple lenses focus various colors at different points. Achromats correct this by using one flint glass and one crown glass, usually cemented together. They usually also correct certain other aberrations. Most high quality instruments have achromats due to their superior performance. Government costs for these were $5.00 to $30.00; our prices reflect substantial savings. Use them for telescopes, magnifiers, eyepieces, low-power microscopes, collimators, riflescopes, experiments, etc. Most are perfect, some slight seconds, all edged, centered, cemented, guaranteed usable.

All our achromats, unless otherwise indicated are Type B (the type generally used). When ordering, list Stock No. and Price. If you include diameters and focal lengths please use millimeter figures. (1" = 25.4mm)

IMPORTANT NOTE: Since many of our lens listings cover surplus items, our stocks are constantly changing. Therefore, we suggest you specify an alternate. If the lens you order is no longer available, we will send the closest substitute unless you state otherwise. Dimensions may vary slightly.

No.	Price PPd.	Dia.	F.L.	Notes
6390	$5.25	7	12	
6391	5.75	4	16	
30,640	3.25	5	16	
6387	6.50	12	17	
6388	5.75	8	18	
6389	5.00	10	22	
6386	5.25	10	25	
30,120	6.75	15	25	Triplet
30,639	3.25	11	25	Ctd.
30,647	4.25	13	25	Ctd.
6382	2.75	9	28	
30,496	3.25	11	29	Ctd.
5148	3.00	18	29	
5131	4.25	18	29	Ctd.
30,472	3.00	18	32	
5206	8.00	16	35	Ctd.
5120	3.25	18	36	
5186	3.75	18	36	Ctd.
6381	2.75	13	37	A
6380	3.10	13	37	A, Ctd.
30,565	3.25	13	38	Ctd.
6191	5.75	18	38	
6358	3.00	18	39	Ctd.
6228	3.00	15	41	Ctd.
6393	5.00	10	42	Ctd.
6376	2.40	16	43	A
6377	2.90	16	43	A, Ctd.
30,229	10.25	23	43	Triplet
40,807	3.25	20	44	Mtd.
6335	7.25	28	47	
6218	3.50	13	49	Ctd.
6362	3.50	17	49	A
6186	2.95	18	49	
6226	3.00	18	49	Ctd.
30,103	3.25	18	49	Mtd.
40,172	2.25	18	50	Mtd.†
30,644	3.25	22	50	
6299	2.00	13	51	C
40,577	2.50	19	51	
6400	3.00	27	53	
6243	3.25	16	54	Ctd.
30,562	3.25	10	55	Ctd.
6292	3.00	22	55	Mtd.
6307	3.00	29	55	
30,571	3.50	16	57	Ctd.
6252	4.00	35	59	Ctd.
6246	15.00	39	63	Ctd.
6355	3.50	28	66	
6148	6.00	30	66	A,

No.	Price PPd.	Dia.	F.L.	Notes
6317	$10.00	30	66	A, Ctd.
6254	3.00	34	66	
6215	3.50	34	66	Ctd.
6266	2.75	19	67	
40,254	3.25	19	67	Ctd.
30,570	3.00	21	67	Ctd.
40,892	3.75	30	67	Ctd.
30,490	3.00	23	68	Ctd.
30,473	3.25	18	75	
30,566	5.50	27	75	Ctd.
6017	2.00	12	80	
6210	2.25	12	80	Ctd.
41,470	9.50	45	81	A, Ctd.
40,631	3.75	35	83	A
40,884	3.50	25	85	Ctd.
40,616	3.50	36	85	Ctd.
6408	3.75	36	87	Ctd.
30,488	3.50	22	88	Ctd.
41,216	4.25	42	88	
6308	2.75	33	90	A
6407	3.25	33	90	A, Ctd.
6279	2.00	16	92	C
41,469	8.50	49	94	A, Ctd.
30,480	3.00	21	95	Mtd., Ctd.
6187	2.50	25	95	
6227	3.00	25	95	Ctd.
6302	2.00	15	98	C
6424	3.00	24	100	
30,484	3.75	33	100	Mtd., Ctd.
30,483	3.00	33	100	Ctd.
40,614	3.50	36	100	Ctd.
6239	3.25	18	102	Ctd.
6357	3.00	34	103	†
6259	2.50	26	104	
6181	3.00	26	105	
30,569	4.00	30	109	Ctd.
40,619	4.50	35	119	Ctd.
6162	3.00	25	122	A
6334	2.75	25	122	
6233	3.25	25	122	Ctd.
6409	2.25	16	124	Ctd.
6410	3.00	16	124	Mtd., Ctd.
30,482	3.25	26	126	Ctd.
40,615	3.50	40	126	Ctd.
40,899	5.00	40	126	Mtd., Ctd.
6176	3.00	38	130	
6285	3.50	38	130	Mtd.
6212	3.50	31	132	Ctd.
5175	2.50	32	132	

No.	Price Ppd.	Dia.	F.L.	Notes
5182	$3.00	32	132	Ctd.
6412	3.50	32	132	Mtd.
6413	2.75	38	132	A
6256	2.25	29	136	C
6258	3.50	33	143	Ctd.
40,618	4.25	42	147	Ctd.
41,816	3.25	48	147	
6244	3.50	48	147	Mtd.
41,011	4.00	45	148	A, Ctd.
5222	12.95	37	150	Ctd.
6171	2.75	32	171	
6232	3.95	32	171	Ctd.
6316	4.50	32	171	Mtd., Ctd.
40,895	5.00	38	172	Ctd.
41,049	4.50	45	172	Ctd.
6253	3.00	32	176	
6353	4.50	35	176	Mtd., Ctd.
40,611	4.50	39	176	Ctd.
5221	4.75	51	184	
6415	3.25	32x34	190	
6313	3.25	45	191	
6183	3.75	45	191	Ctd.
40,970	4.25	45	191	Mtd., Ctd.
5117	4.00	52	193	
5216	4.50	52	193	Ctd.
41,266	12.50	52	220	Ctd.
60,235	7.00	33	250	A, Mtd., Ctd.
6417	6.00	44	254	Ctd.
41,267	13.70	52	254	Ctd.
41,065	5.00	30	273	
6329	2.00	25	279	C
30,534	5.50	36	336	
60,428	13.50	48	360	Mtd.
40,802	17.50	61	365	Ctd.
41,269	13.70	52	508	Ctd.
41,270	13.70	52	762	Ctd.
30,201	5.25	32	788	Ctd.
41,271	13.70	52	1016	Ctd.
30,202	8.95	42	1041	Ctd.†
30,190	65.00	76	1143	Ctd.†
30,187	13.50	51	1270	Ctd.†
50,107	109.50	102	1524	Ctd.†
70,163	219.50	127	1803	Ctd.†

†Airspaced

Negative Achromats

No.	Price Ppd.	Dia. Mm.	F.L. Mm.	Notes
60,122	$26.95	26	—44	Mtd.
30,448	5.75	18	—47	
30,255	5.00	42	—139	Ctd.

SIMPLE LENSES

Here's the largest collection of simple lenses under one roof! They have been gathered from many different sources; some war surplus, some commercial. All are sold as "seconds" because of slight chips, scratches, or similar small imperfections. In most cases, the imperfections will not interfere with their use. We cannot fill special requests for perfect lenses, or for coated ones. **Occasionally, when the exact lens you order is out of stock, we will substitute another lens that most nearly fits your requirements unless your order states "no substitutes."**

When ordering, please remember to include: (1) Stock No. (2) Price (3) Diameter (4) Focal Length. Our minimum order is **$5.00,** but other items may be included in your order to make up the minimum. (1"-25.5mm)

BETTER GRADE SIMPLE LENSES

Over the years we have received requests from our customers for BETTER GRADE simple lenses. We have selected the very best from each lot. These are listed below the ordinary simple lenses of each type.

Plano-Convex Lenses

Plano-convex lenses have one flat and one curved face. They are thicker in the middle than at the edges. Useful as eyepiece lenses, magnifiers and as objectives on inexpensive microscopes.

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,009	$0.75	10	19
94,010	.70	11	20
94,015	.75	12.5	23
94,020	.50	9.5	25
94,022	.65	13	26
94,027	.50	7	31
94,029	.60	12.5	35
94,030	.65	17	37
94,032	.50	8	38
94,034	.60	12.5	38
94,031	.65	15.5	38
94,035	.75	19.5	38
94,040	.60	16	40
94,687	.50	12	42
94,043	.60	19	42
94,044	.75	27	42
94,688	.50	13	48
94,049	.60	18	54
94,056	.50	10	55
94,058	.50	6	58
94,061	.80	35	61
94,064	.50	19	67
94,065	.50	5	68
94,066	.50	11.5	69
94,069	.75	43	76
94,689	.50	25	78
94,072	.50	8	81
94,076	.75	28	87
94,077	.50	7	92
94,081	.50	19	94
94,085	.50	14	97
94,087	.50	29	99
94,089	.50	24	105
94,095	.50	7.5	125

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,690	$0.50	22.5	136
94,098	.50	9.5	150
94,099	.50	12	150
94,100	.50	16	152
94,102	1.15	31	152
94,105	.55	27	172
94,108	.50	5	186
94,116	.50	8	203
94,748	1.00	33	223
94,119	.50	15.5	238
94,122	.50	9	265
94,739	.95	42	267
94,126	1.25	51	293
94,127	4.25	89	305
94,745	.95	38	308
94,744	.95	38	333
94,742	.95	38	364
94,131	1.50	44	401
94,741	.95	40	444
94,132	.75	33	453
94,133	4.50	89	483
94,135	6.00	86	571
94,740	.95	40	571
94,692	2.00	50	586
94,756	1.00	49	610
94,677	4.00	88	635
94,747	.95	40	667
94,743	.95	38	800
94,746	.95	40	1000
94,138	.80	25	1019
94,140	.80	30	1031
94,141	.85	27	1269
94,142	.50	11.5	1270

Double-Convex Lenses

Double-Convex lenses have 2 curved faces, are thicker at the center than the edges. Some are symmetrical (with both faces curved equally), others have steeper curves on one side.

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,182	$0.95	6	8
94,184	.65	5.5	9
94,192	.60	5	13
94,188	.95	10†	13
94,197	.60	7.5	15
94,652	.90	15	15
94,203	.50	5	18
94,201	.55	7.5	18
94,202	.65	10	18
94,205	.75	13	18
94,200	.90	16	18
94,214	.95	18	20
94,761	.60	7	21
94,215	.65	12	21
94,218	.50	5.5	23
94,223	.55	13	26
94,225	1.25	29	26
94,227	.65	15	29
94,228	1.10	26	30
94,230	1.35	35	31
94,232	.50	13	33
94,233	1.50	40	33
94,236	.75	14	34
94,237	1.25	36	35
94,240	.65	19	37
94,243	.50	13	38
94,245	.65	22	38
94,242	.90	33	38
94,246	.50	9.5	39
94,247	.60	17.5	39
94,249	.65	24	40
94,255	.65	25	43
94,256	.75	29	43
94,257	.90	35	43
94,261	.60	18.5	45
94,262	.70	25	45

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,265	$0.50	16	46
94,266	.75	27	46
94,268	.60	20.5	47
94,270	.50	14	48
94,269	.85	31	48
94,274	.90	25	50
94,277	.50	16	51
94,281	.50	19	53
94,282	.80	37	53
94,283	.65	32	54
94,673	.50	13	58
94,286	.60	24	58
94,289	1.00	32	59
94,292	.50	18	62
94,293	2.50	60	62
94,295	.60	31	63
94,296	.50	24	64
94,298	.60	40	64
94,300	.50	27	65
94,301	.50	33	65
94,303	.50	13	67
94,305	3.50	76	71
94,306	1.90	60	72
94,307	.55	27	74
94,310	.60	32	77
94,671	.75	7	80
94,316	.50	24	89
94,318	.85	56	89
94,650	2.50	41	100
94,644	1.60	30	100
94,321	.50	24	102
94,724	.77	51	127
94,330	2.00	102	250

*Coated †Mounted

Better Grade Plano-Convex

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,725	$1.20	5	8
94,007	.90	10	17
94,749	1.00	9.5*	18
94,021	.75	13.5*	25
94,759	.95	10.5	29
94,693	.95	15	29
94,694	.90	21	36
94,148	.85	12.5	38
94,149	1.75	23*	41
94,695	.75	13	48
94,152	.80	17	49
94,737	3.00	48	57

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,161	$0.50	7.5	60
94,164	.75	16.5	79
94,168	.50	5.5	92
94,738	.65	15*	112
94,171	.50	6	134
94,697	.75	22.5	136
94,173	.75	16	152
94,176	.50	6	201
94,667	1.25	40	285
94,758	.65	20.5	393
94,698	.65	14.5	1073

*Coated

Better Grade Double-Convex

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,710	$1.20	5.6	7.3
94,752	1.10	9.7*	7.6
94,335	.75	7.5	15
94,754	.95	10.5*	15
94,338	.75	8	18
94,750	.90	9.5*	19
94,342	1.20	18	20
94,727	.75	9	22
94,711	.60	5.5	23

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,753	$0.80	11*	31
94,349	.85	19	33
94,352	.90	14.5†	35
94,354	.65	12	38
94,357	.80	18	38
94,358	.60	9.5	39
94,359	.65	16	39
94,361	.75	21.5	44
94,362	.65	17.5	44

More on next page.

Better Grade Double Convex (Cont.)

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,368	$0.75	12*	50
94,714	.75	22	51
94,369	1.20	33*†	55
94,370	.95	33*	55
94,372	.85	23	59
94,373	1.00	38	61
94,375	.80	33	65
94,728	.70	22	67
94,376	$0.80	26	68
94,377	.90	37	73
94,380	.90	32*	82
94,757	1.00	52**	89
94,735	4.65	51	100
94,717	.85	35	101
94,385	1.50	52	106
94,388	1.00	29	114

*Coated †Mounted
**Beveled Edge

Plano-Concave Lenses

Plano-concave lenses are flat on one side and curved inwardly on the other, thinner at center than at edges. All reducing lenses with negative focal lengths.

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,389	$0.50	5	-20
94,391	.50	13.5	-22
94,718	.90	17.5	-24
94,404	.50	7	-25
94,454	.50	15.5	-28
94,396	.65	18	-30
94,397	.85	25	-33
94,719	2.50	32	-34
94,400	.60	18	-36
94,402	.50	13.5	-46
94,406	$0.60	16	-53
94,408	.75	33	-62
94,411	.55	15.5	-74
94,414	1.00	53	-80
94,416	.65	22	-85
94,418	.50	13	-89
94,420	.50	16.5	-100
94,422	.60	23	-134
94,425	.50	12	-148

Better Grade Plano-Concave

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,429	$0.85	18	-33
94,430	.65	15.5	-39
94,432	.65	13.5	-46
94,435	$0.75	16	-53
94,437	.95	29	-73
94,439	.75	16.5	-100

Double-Concave Lenses

Double-concave lenses are curved inwardly on both sides and thinner at the center than at the edges. These are also reducing lenses and have negative focal lengths.

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,440	$0.65	5	-4
94,675	.60	6	-8
94,441	.65	9	-8.5
94,442	.50	11	-13
94,445	.50	13	-17
94,447	.50	12	-20
94,448	.60	18	-21
94,453	.60	23	-27
94,458	.60	21	-30
94,461	$0.50	19	-35
94,463	.80	33	-38
94,466	.60	20	-43
94,472	.60	25	-48
94,474	.50	12.5	-50
94,476	.55	19	-50
94,479	.50	17	-55
94,483	.50	12	-68
94,485	.50	19	-70

Better Grade Double-Concave

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,751	$0.90	9.5*	-4.5
94,700	.85	8	-6
94,755	.90	10.5*	-9
94,497	.75	17	-34
94,498	.90	22*	-37
94,496	$1.20	33	-38
94,500	.65	10.5	-45
94,501	.90	25*	-48
94,503	.70	17.5	-52
94,507	.85	19	-79

*Coated

20 Split Retaining Rings
Cross section type for greater bearing surface. 4 each: .618, .878, 1.136, 1.400, 1.665" O.D. **No. 60,207 $2.25 Ppd.**

Meniscus (Convex-Concave)

Meniscus lenses curved on both faces. Unlike double-concave or double-convex lenses, the curves are in same direction. Positive meniscus is thicker in center than at edges, negative meniscus thicker at edges.

Positive Meniscus

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,514	$0.50	15	52
94,521	.50	18	85
94,523	.65	21	92
94,526	.50	15	101
94,528	.80	35	105
94,535	.75	33	120
94,722	$0.50	19	122
94,538	1.50	59	132
94,543	.50	18	212
94,548	.80	38	403
94,661	3.00	88	667

Better Grade Positive Meniscus

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,702	$0.65	7*	17
94,703	.75	15*	23
94,552	.70	15	52
94,557	.60	18	91
94,561	.80	25	136
94,760	.65	10.5	29
94,643	1.60	30	166
94,649	2.50	41	166
94,734	4.25	51	166
94,664	1.50	58	222
94,642	1.60	30	250
94,648	2.40	41	250
94,733	3.50	51	250
94,668	$2.15	58	285
94,662	1.30	58	308
94,641	1.60	30	333
94,647	2.40	41	333
94,732	3.50	51	333
94,663	1.30	58	400
94,640	1.60	30	500
94,646	2.40	41	500
94,731	3.50	51	500
94,639	1.60	30	1000
94,645	2.40	41	1000
94,730	3.50	51	1000

*Coated

Negative Meniscus

These are reducing lenses and have negative F.L.

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,563	$0.65	5	-8
94,564	.50	9	-15
94,570	.70	23.5	-39
94,576	.60	21	-66
94,580	.75	35	-73
94,583	.50	18	-89
94,586	.75	40	-95
94,591	$0.70	37	-125
94,598	.80	55	-169
94,601	.90	51	-264
94,704	.90	37.5	-505
94,602	1.30	58	-800
94,603	.60	34	-1399

Better Grade Negative Meniscus

No.	Price Ppd.	Dia. Mm.	F.L. Mm.
94,605	$0.65	12.5	-20
94,607	.85	13	-31
94,609	.65	15.5	-41
94,612	.65	14.5	-72
94,613	$0.80	24	-74
94,621	1.35	57	-180
94,624	1.50	52	-238

Cylinder Lenses

These magnify in only one dimension.

No.	Type	Price Ppd.	Size Mm.	F.L.Mm.
12,050	DCX	$0.75	3x9	1.4
30,620	DCX	.75	4.5x10	2.1
12,043	PCX	.75	3.5x5	3.3
94,723	PCX	.75	4.8x5.3	11
40,212*	PCX	2.70	24x169	44
30,240*	PCX	3.50	57x200	86
50,157*	PCX	5.50	57x400	86

*These are plate glass and are slight seconds only because of small edge chips.

Magnifiers, see pages 28-33

Condensers Plano-Convex, Double-Convex, Aspheric

Condensing lenses concentrate light into a projected beam. Used in projectors, enlargers, spotlights, photocell systems, etc. Generally condensing lenses are mounted in pairs so that their convex surfaces are nearly in contact. The equivalent F.L. of the lenses together equals one half the F.L. of one element.

Condenser equipped enlargers (usually plano-convex) produce snappier prints. Projectors, especially slide projectors, have two unsymmetrical-convex lenses and sometimes only one condenser element.

To determine the diameter of the condenser you need, draw a circle around the largest slide you plan to project. Because the slide is mounted and positioned a short distance from the condensers, you will require lenses larger in diameter than the drawn circle. Useful suggestions are given at right:

Picture or (Slide Size)	Dia. in Mm	F.L. in Mm of Condenser to Use
8mm	19 to 44	13 to 76
16mm	25 to 44	25 to 76
35mm	51 to 76	76 to 102
1¼ x 1-5/8"	60 to 89	76 to 127
1-5/8 x 2½"	89 to 127	114 to 178
2¼ x 2¼"	102 to 127	127 to 178
2¼ x 3¼"	114 to 127	140 to 178
2½ x 4½"	152 to 178	229 to 254
4 x 5"	165 to 203	254 to 305

Most of the lenses listed are seconds because of small chips, scratches, bubbles, etc. That won't interfere with the image quality because defects are not projected to the same plane as the film. For additional small condensers see simple lenses (pg. 137-138).

Prices shown are for one lens. Projectors and enlargers normally require two.

Plano-Convex Regular

No.	Price Ppd.	Dia. mm.	F.L. mm.
30,525	$1.15	23	33
1183*	2.00	39	52
30,543	1.50	49	57
1155	.80	49	127

*2043X GLASS. Heat absorbing glass with bubbles which do not affect optical image.

Plano-Convex Large

No.	Price Ppd.	Dia. mm.	F.L. mm.
1144	$ 7.50	113	165
1145	18.75	127	178
1189	5.00	152	356
70,302*	20.00	165	229
70,303*	46.50	203	254
70,304*	56.50	203	305

*Better grade

Unsymmetrical Double-Convex

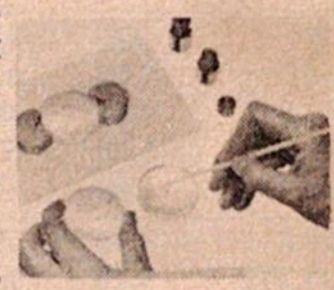
No.	Price Ppd.	Dia. mm.	F.L. mm.
30,541	$1.00	22	18
30,542	.75	25	21
30,499	1.25	33	32
1158	1.00	54	70
4034 (set of two)	2.00	51	76
1162	1.25	60	76

Aspheric Condensers. These have a short F.L. in relation to their diameter. Use when compact, intense light system is needed.

No.	Price Ppd.	Dia. Mm.	F.L. Mm	Comments
40,227	2.50	44	39	Unsym.
40,339	2.00	72.5	46	DCX
60,356	1.75	70.5	62	PCX
60,358	1.75	67	73	PCX
60,359	1.75	67	46	PCX
Condensers of Pyrex® Brand Sheet Glass				
40,908	1.98	43	62	PCX
40,229	.65	35	65	Unsym. DCX
1184*	1.00	42	60	Meniscus

*2043 Glass

Lens Cement Bonds At Room Temperature!



Outstanding polyester resin bonds lens elements in 3 hours without heat! Superior to Canada Balsam. Refractive index (nD)—1.55 at 25° C. Withstands temperatures of -65° to +212°F. One bottle cement and one bottle catalyst.

3cc Set No. 40,774 $1.70 Ppd.
2 oz. Set No. 60,506 $8.70 Ppd.

Lens Cleaning Supplies

Lens Brush: 5/8" long, soft bristles retract in gold-finished, metal case with pen top and clip. Fits shirt pocket. 2¾" long, ½" dia. **No. 40,504 $1.95 PPd.**

Lens Cleaning Tissue: Top quality, soft, made for optical instrument lenses & objectives. Pure, won't scratch, low cost, used at army optical manufacturing & main. shops. Meets Mil. Specs. UU-P-313C.

500 sheets (7¾ x 10¾") **No. P-736 $3.00 Ppd.**
500 sheets (7¾ x 3½") **No. P-60,375 $1.00 Ppd.**

16 x 18" Lens Cleaning Cloth with silicone, use on finest optics, rayon, soft, no impurities, won't scratch, wash & reuse.

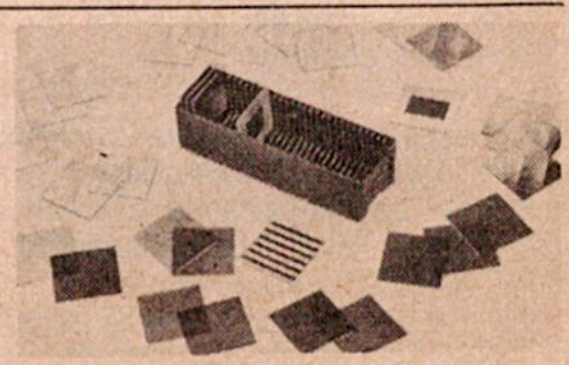
Pkg. of 3 **No. P-60,059 $1.15 Ppd.**
Pkg. of 100 **No. P-70,137 $33.50 Ppd.**

Magnifier Lenses

Use these lenses as is, or add mounts for convenience. They are unmounted, commercial magnifiers, seconds because of slight chips, scratches, etc. In most cases the defect will not interfere with the performance of the finished magnifier. All are double-convex.

Size MM	F.L. MM	No.	Price, Ppd.
51x51	64	12,051	$1.00
51x51	127	12,029	.75
45x64	133	12,062	.75
38x76	182	12,033	.60
64x64	235	12,057	1.00
29	26	12,038	1.25
26	32	12,072	.70
26	44	12,073	.60
60	59	12,091	2.00
25	62	12,071	.50
59	67	12,078	1.10
31	77	12,053	.60
46	95	12,092	.75
64	127	12,080	1.10
64	154	12,010	.90
89	200	12,015	1.50

Mini Optical Lab . . . Don't be caught short of miscellaneous optics!



Perfect collection of devices for optical experimenters, hobbyists, schools, and industry. A handy assortment of items often required but not on hand, or only available in large sheets. Lab incl.: 2 ea. 1st & 2nd surface mirrors; 2-way mirror (flat beam splitter); ground glass; opal glass; 6 slide cover glasses; 6 colored plastic filters; 2 lenticular screens; 3 ronchi rulings on film; 3 aluminuzed Mylar films; 3 polarizers; diffraction grating replica; 1 set of slits on film; packed in 2 x 2" slide magazine. **No. 60,898 $12.50 Ppd.**

Front Surface Mirrors

A front surface mirror is aluminized on surface nearest objects to be viewed. Light reflects from this near surface with no refraction. A second surface conventional type mirror reflects light from its back (far) surface. Refraction occurs in a second surface mirror (see sketch). These front surface mirrors are some of the best available for optical instruments. Size and thickness may vary.

Front Surface Mirrors, Plane

No.	Price Ppd.	Size Mms.	Thickness	Notes
40,238	**$0.75**	9 x 19	1.75	
30,624	**1.25**	12 dia.	0.15	Ultra Thin
40,284	**.75**	13 x 25	6.0	
30,546	**.75**	14.5 x 19	1.75	
30,625	**1.50**	18 dia.	0.15	Ultra Thin
40,286	**1.00**	21 x 26	6	
30,621	**2.25**	21 dia.	1.2	
30,428	**.75**	22 x 35	1.6	
30,286	**2.50**	25 x 35	6.0	Flat to ¼ wave
30,626	**1.65**	25 dia.	0.15	Ultra Thin
30,429	**.60**	26 x 40	3.2	
30,622	**1.20**	30 dia.	1.2	
26	**1.00**	34 dia.	3	
30,623	**1.40**	40 dia.	1.0	
30,465	**1.95**	40.5 dia	5.0	
591	**.75**	43 x 46	3	
547	**1.00**	43 x 140	3	
41,619	**1.50**	49 x 49	.75	Very thin
40,040	**1.00**	51 x 76	6.0	
40,773	**.90**	57 x 68.5	2.5	
589	**1.50**	59 dia.	1.8	
41,742	**1.75**	60x131	4	Bev. edges; cut corn.
40,324	**1.25**	63 x 76	3	
30,209	**4.00**	67 x 83	5	beam spltr. shpd.
41,620	**2.00**	70 x 70	1	Very thin
40,041	**1.50**	76 x 102	6	(3 x 4")
41,621	**2.75**	81 x 100	1	Very thin
40,042	**2.75**	102 x 127	6	(4 x 5")
41,320	**6.70**	127 x 178	1.6	(5 x 7)"
40,043	**3.75**	127 x 178	6	(5 x 7)"
60,947	**3.00**	152 x 152	6	
41,405	**5.00**	169 x 194	6	(6¾ x 7¾") Bev. Edges
41,321	**12.50**	204 x 254	1.6	(8 x 10")
40,067	**7.25**	204 x 254	6	(8 x 10")
85,036	**15.50**	254 x 356	6	(10 x 14")
71,717	**7.00**	267 x 267	6	
85,206	**20.00**	406 x 406	6	(16 x 16")
85,207	**39.50**	508 x 609	6	(20 x 24")

Front Surface, Concave Mirrors

No.	Price, Ppd.	Size, Mm	F.L. Mm	Notes
566	**$0.75**	35	15	Metal
41,051	**1.00**	33	21	Glass
41,052	**1.25**	32	25	Glass
41,981*	**3.00**	66	25	Glass
41,053	**1.00**	35	38	Glass
41,054	**2.50**	52	38	Glass
41,220	**16.00**	75	760	Glass

*19mm hole in center.

Surplus, Large Front Surface Mirrors

Real bargains. Manufacturer's surplus stock on ¼" thick glass; aluminized overcoated surfaces have minor scratches and imperfections which should not interfere with normal use. Careful cleaning will improve most. *1½" cut off corners.

No.	Price Ppd.	Size in inches	Approx. Wt.
70.974	**$3.00**	*8 x 8	2 lbs.

Parabolic Mirrors Of Pyrex® Brand Glass

No.	Price	Dia.	F.L.	Thickness
5002	**$64.00 Ppd.**	6"	48"	1"
85,069	**96.00 T.C.C.**	8"	64"	1-3/8"
85,070	**195.00 T.C.C.**	10"	80"	1¾"
85,071	**300.00 T.C.C.**	12½"	100"	2-1/8"

Precision, High Quality, Spherical Mirrors

Aluminized, overcoated, Pyrex® brand sheet glass. f/10, polished to better than ¼ wave. Use to concentrate light or build your own schlieren system.

No. 50,051 $27.50 Ppd. 4¼" dia. 45"F.L.
No. 71,026 $98.00 Ppd. 6" dia. 60" F.L.

Astronomical Telescope Mirrors. Polished, aluminized and overcoated, ¼ wave or better.

No.	Price	Dia.	F.L.	Thickness
40,913	**$6.25 Ppd.**	2½"	25"	3/8"
50,082	**16.00 Ppd.**	3"	30"	3/8"
50,051	**27.50 Ppd.**	4¼"	45" PYREX®	5/8"

Front Surface Elliptical Mirrors

Ground and polished: aluminized and overcoated.

Flatness	Size	No.	Price Ppd.
¼ wave	7/8 x 1-15/64 x ¼"	**30,259**	**$5.50**
¼ wave	1-1/16 x 1½ x ¼"	**30,260**	**7.50**
¼ wave	1¼ x 1¾ x 3/8"	**30,188**	**5.95**
1/8 wave	1¼ x 1¾ x 3/8"	**30,205**	**7.95**
¼ wave	1½ x 2-1/8 x 3/8"	**30,258**	**8.95**
¼ wave	1-7/8 x 2-21/32 x 3/8"	**30,261**	**16.95**
¼ or better	2¼ x 3-1/5 x 3/8"	**41,131**	**28.75**

See & Not Be Seen One-Way Transparent Glass Mirrors

Someone looking into this glass "mirror" sees only an image of himself, unaware he is being watched. Light on observer's side should not be too bright. Hard chromium surface. 50% reflection; 4-8% transmission

No. 30,630* Size 2 x 2" (Pkg. of 2) **$1.00 Ppd.**
No. 40,044 Size 2 x 3" **.75 Ppd.**
No. 40,045 Size 3 x 4" **1.90 Ppd.**
No. 40,046 Size 4 x 5" **2.75 Ppd.**
No. 40,047 Size 5 x 7" **3.95 Ppd.**
(*Write for price on 100 or more.)

Transparent Mirror Film—.008" thick
21 x 36" Film Sheet. **No. 70,326 $3.00 Ppd.**
10½ x 18" Film Sheet. **No. 60,113 1.00 Ppd.**

Half-Aluminized Film Sheets . . . "See-Thru Fun"

Exciting ideas for hobby, craft, and decorating. Ideal as 1-way mirrors for watching birds and small animals feeding and romping, for trick photography image distorting, for seeing backs of display items. Make mini fun house mirrors, reflective mobiles, light reflectors, Christmas tree decorations, model railroad lakes, place cards for parties! Each sheet 6¼ x 8 x .008" thk. Instr.

Pkg. of 12 (600 sq. in.) **No. P-41,429 $1.00 Ppd.**
Pkg. of 100 (4,980 sq. in.) **No. P-41,430 $6.50 Ppd.**

Unmounted Wedge Window: 60 sec. deviation. 92 mm dia. x 8.5 mm thick. Borosilicate crown glass n=1.517; v=64.5 **No. 30,155 $5.00 Ppd.**

Diopter Gage For Lens Curvatures

Precision instrument measures lens curvatures, selects beams, etc. 0 to ± 17 diopters in ¼-diopter increments. Directions to compute F.L. on all 6 types of spherical lenses, plus diopter-to-mm conversion for crown flint glass. **No. 40,411 $29.50 Ppd.**

Regular Mirrors On Flexible Backing

Enhance bathroom accessories; cover jewel boxes, picture frames; etc. Peel 6x6" sheets for single use, or cut in rows for convex or concave strip mirrors. No sharp edges.

No.	Price	Mirrors	Size
71,260	**$9.00**	3200	¼ x ¼" on 9¾ x 19½" sheet
60,815	**2.75**	576	¼ x ¼" on 6 x 6" sheet
60,239	**2.75**	144	½ x ½" on 6 x 6" sheet
71,261	**6.00**	50	2 x 2" on 10 x 20" sheet
60,241	**1.20**	36	1 x 1" on 6 x 6" sheet
60,244	**1.50**	9	2 x 2" on 6 x 6" sheet
60,245	**.25**	1	4 x 15cm (1-5/8 x 6")
60,246	**.35**	1	10 x 10cm (4 x 4")
60,247	**.65**	1	10 x 15cm (4 x 6")

Amazing Mirrors With No Glass

- **Lightweight** • **Startingly Clear**
- **Shatterproof** • **Non-Fogging**

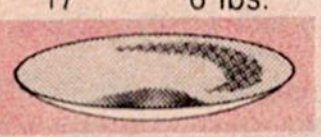
A fraction of the cost and weight of comparable high-quality, first-surface, plate glass mirror! Polyester film vacuum-coated with aluminum, stretched over lightweight backing (only 6 oz. per sq. ft.). Mounting anywhere even from ceiling (double-faced tape, glue, or screws). Amazing optical quality: no ghosts, no distortion. Will not fog, even after hot shower. Shatterproof for hospitals, schools, children's rooms, etc.

12 x 16 x 9/16" (9 oz.)	**No. 71,339**	**$10.00**
16 x 24 x 9/16" (1 lb.)	**No. 80,145**	**$14.25**
24 x 24 x 1-3/16" (1½ lb.)	**No. 80,146**	**$20.00**
48 x 96 x 1-3/16" (12 lb.)	**No. 85,199**	**$110.00**

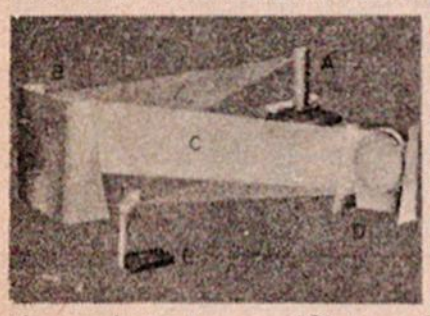
Second Surface, Glass Concave Mirrors

No.	Price Ppd.	Dia.	Approx. F.L.	Weight
60,616	**$3.00**	6"	16"	4 oz.
60,617	**4.25**	8"	16"	10 oz.
70,671	**5.75**	12"	20"	1¼ lbs.
80,097	**12.25**	16"	17"	6 lbs.

Big Concave Mirror



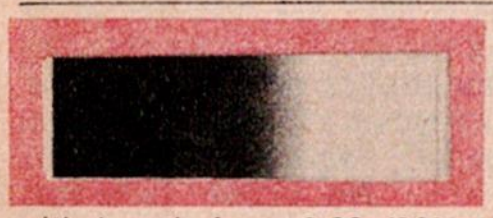
Second surface glass mirror to make larger magnifying make-up mirror, a solar furnace, your own fun house, special photo effects, etc. 16" dia.; 1/8" thick; 15/16" deep; 17" F.L. 6 lb. Back aluminized. **No. 80,097 $12.25 Ppd.**



4¼" & 6" Schlierens

Use to study air current flow, test internal character of glass (striae), determine sound velocity and mass of microscopic particles, etc. A typical set up: Light (A) strikes mirror (B); reflects through test area (C) to mirror (D); and then to screening device (E) which cuts light cone. Viewer sees field as bright or gray with bright patches, depending on air flow. Each system contains 2 alum. front-surface mirrors (4¼ or 5" dia.), f/10, coated w/silicon dioxide & mounted in metal stands; a Foucault tester; mirror covers; instr.

4¼" Schlieren Sys., 45" F.L. **No. 71,014 $99.50 Ppd.**
6" Schlieren Sys., 60" F.L. Large mirrors give twice the test area. **No. 71,013 $245.00 Ppd.**

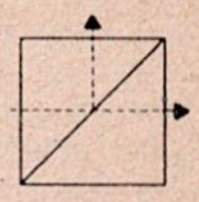


Variable Density Beam Splitter

A linear density wedge 1 x 3" inconel coated. Density varies linearly with length from 0.02 (96% transmission) to 2.00 (1% transmission). Ideal for precise adjustments in intensity of spectrophotometers, monochromators, lasers, etc. May be used two at a time to control the transmission of an optical beam up to 1" in dia. The units are moved differentially to produce a smooth variation in transmitted energy. Instr. **No. 41,960 $26.50 Ppd.**

Beam Splitters . . . Prism Type

A prism beam splitter is 2 right angle prisms cemented to form a cube. Sometimes one hypotenuse is partially aluminized. When you look into it you see straight ahead as well as at a right angle. Transmission 30%. Reflectivity 30%. Approx. 40% of light absorbed by reflectance coating.



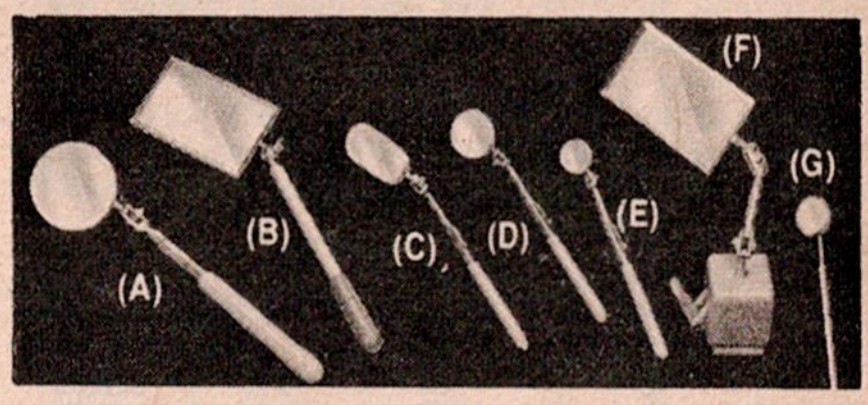
Size 15mm. cube	**No. 30,329 $11.00 Ppd.**
Size 20 x 29mm.	**No. 40,887 11.75 Ppd.**
Size 25mm. cube	**No. 40,996 17.50 Ppd.**
Size 40mm. cube	**No. 41,211 16.50 Ppd.**
Size 49 x 53mm	**No. 60,273 15.00 Ppd.**

Mirror-Type Beam Splitter

Non-absorbing beam splitter reflects ⅓ of light, transmits remainder. Very neutral color characteristics. Interference coating extra durable. Glass parallel to 20 seconds, in most cases, surface flat to 10 rings.

67 x 83 x 5mm	**No. 578**	**$5.00 Ppd.**
57 x 74 x 4mm	**No. 40,921**	**$5.00 Ppd.**
21.5 x 30 x 1.6	**No. 30,725**	**$1.25 Ppd.**
9 x 19 x 1.3mm	**No. 40,236**	**$1.00 Ppd.**
7.5 x 20.5 x 1mm	**No. 30,462**	**$1.00 Ppd.**

Ball-Joint Glass All-Angle Viewing Mirrors



Double ball joints swivel these copper-backed mirrors a full 360° for accurate inspection of hidden areas. Tempered spring steel joints move freely, take endless repositioning. Chrome-plated handles, vinyl grips.

Item	Stock No.	Price Ppd.	Mirror Size	Arm Size
(A)	**60,014**	**$3.50**	2¼"	7-13"*
(B)	**60,010**	**3.50**	3½ x 2"	7-12"*
(C)	**60,012**	**2.15**	1 x 2"	6"
(D)	**60,013**	**2.35**	1¼"	8"
(E)	**60,011**	**2.30**	¾"	7"

*Telescoping handle non-swivel.

(F) 2-1/8 x 3-1/2" Mirror on Alnico Magnetic Base. Has two ball joints. **No. 60,015 $8.45 Ppd.**

(G) 15/16" Dental Inspection Mirrors. Will withstand extreme temperatures. Arm size 6½". (Non swivel.)

Standard	**No.60,004**	**$1.80 Ppd.**
Magnifying	**No.60,005**	**$1.80 Ppd.**

High Quality Gold Mirrors . . . Flat & Concave for I. R.

For infrared or visible light. Flat mirrors are effecient reflectors, concave mirrors focus infrared light (ordinary lenses & alum. coated mirrors are inefficient in I.R. spectrum). Reflectivity: 35% at 4000-4500Å; 46% at 5000Å; 81% at 5500Å; 92% at 6000Å; 98% at 7800Å; to beyond 15 microns. Iconel layer under gold increases opacity, prevents I.R. light from heating substrate. Protective stripping lacquer coated.

Flat Mirrors (iconel and gold on plate glass):

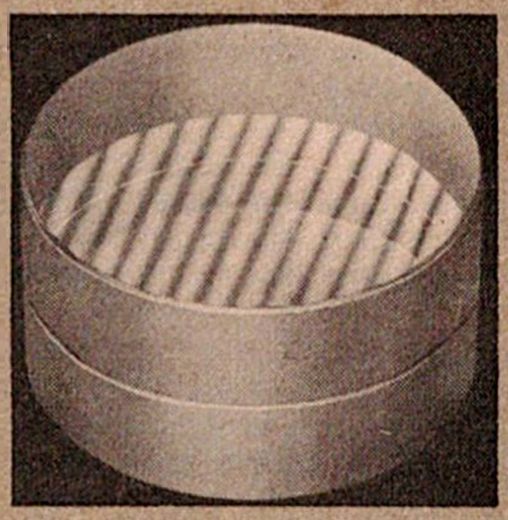
3 x 4 x ¼" thick	**No. 41,801**	**$3.25 Ppd.**
4 x 5 x ¼" thick	**No. 41,800**	**$4.50 Ppd.**
5 x 7 x ¼" thick	**No. 41,802**	**$6.75 Ppd.**
8 x 10 x ¼" thick	**No. 71,709**	**$12.75 Ppd.**

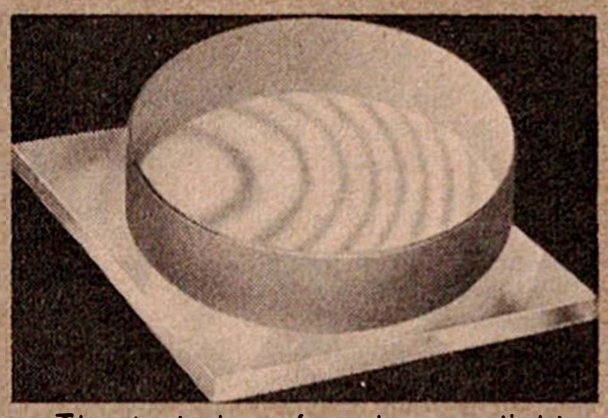
Concave mirrors (iconel and gold on flint glass):

5 x 32 dia. x 25mm F.L.	**No. 41,806**	**$4.00 Ppd.**
8 x 52 dia. x 38mm F.L.	**No. 41,807**	**$6.00 Ppd.**
8 x 75 dia. x 760mm F.L.	**No. 41,808**	**$12.50 Ppd.**

QUARTZ OPTICAL FLATS

The tested surface is accurately flat as shown by the straightness, parallelism, and even spacing of the bands.





The tested surface has a slight spherocity as shown by the curved bands.

- **Low-priced**
- **Top Quality**
- **In Stock**
- **U. S. A. Made**
- **Certified Accuracies**
- **1/5 & 1/10 Wave**

OVERSTOCKED! 1/5 WAVE PRICES INCLUDE 25% REDUCTIONS!

Edmund Scientific offers single surface flats of clear fused quartz in certified optical accuracies of .000005"(1/5 wave) or .000002" (1/10 wave) or better. The second surface is felt polished for fine viewing of interference patterns. All edges are ground and chamfered. Flats made of quartz are superior due to their very low thermal expansion . . . permitting continuous use without distortion. They also have a greater resistance to abrasion. Each is interferometrically controlled and furnished with a certification of calibration certifying its accuracy. Individually cased. These flats are suitable for optical and precision machine shops, amateur telescope makers, in optical instruments and ultra violet and laser applications.

Dia.	Thickness ±.040"	Wave	Stock No.	Price Ppd.
1"	½"	1/10	**1913**	**$20.00**
2	½	1/10	**1914**	**40.00**
3	5/8	1/10	**1915**	**60.00**
4	¾	1/10	**1611**	**130.00**
6	1	1/10	**1612**	**280.00**
2	½	1/5	**1917**	**22.50**
3	5/8	1/5	**1918**	**37.50**
4	¾	1/5	**1613**	**79.00**

All of our Optical Flats and Precision Flat Mirrors (below) are deliverable from stock. Special ones can be made to order. Write our Sales Engineering Dept. for special orders.

PRECISION FLAT MIRRORS (ALUMINIZED OPTICAL FLATS)

Made from high quality Optical Flats, these mirrors have same guaranteed accuracies as our flats . . . both .000005" (1/5 wave) and .000002" (1/10 wave) or better. The flats are aluminized and then overcoated for use wherever precision and flatness of a mirror are an absolute necessity. Exceptionally good for laser applications and holography, also in telescopes, siderostats, coelostats, and as reflector for auto-collimating photographic lenses and telescope lenses. Individually cased. Instr.

Dia.	Thick. ±.040"	Wave	Stock No.	Price Ppd.
1"	½"	1/10	1919	**$21.00**
2	½	1/10	1920	**42.00**
3	5/8	1/10	1921	**66.00**
4	3/4	1/10	1615	**136.00**
6	1	1/10	1616	**292.00**
3	5/8	1/5	1924	**42.00**

Free Optical Flat Booklet by Fred Abbott

Written for Edmund Scientific Co. by Optical Consultant, Fred Abbott, this 16-page informative booklet details optical flat theory use, and applications. Included free with every optical flat purchase or yours free just for asking for booklet **No. 9883.**

Optical Flat Theory. Light rays from one source may travel along 2 different optical paths and recombine later in a clearly perceivable phase relationship. An optical flat is an ingenious devise to use these light rays for measuring purposes.

What an Optical Flat Shows. When a flat is placed on a surface to be tested (under monochromatic light), dark and bright lines, called "interference bands", (contour map of the work surface) appear. The amount the bands curve, with reference to distance between them, indicates amount of flatness error. Straight, parallel, and evenly spaced bands mean the work surface is accurately flat.

Applications. They are versatile devices for measuring surface flatness of polished areas; determining variations between work surfaces and surface of the optical flat; inspecting gage blocks for wear and accuracy; testing various types of lapped and polished surfaces, to test prisms, filters, optical windows, etc.

Low-Cost, High-Visibility Monochromatic Lamp

This extremely portable 20 lumen light source is the most effective light our engineers have ever seen for viewing Brewster's fringes, Newton's rings, testing optical flats, prisms, lenses, thin films, etc. Using a highly versatile green filtered gaseous discharge lamp, it displays the sharpest, best defined interference fringes of any lamp we've ever tested at any price, including the sodium vapor type. So sharp it can be used in full room light. Performance includes 1200 starts per bulb. 120° angle of diffusion, 4 watts, 5460Å wavelength, uniform illumination over 3 x 5" window. Soft rubber feet and special slant design puts light where you need it. 115v, 1 yr. mfg. guar., complete instr. incl. **No. 71,780 $37.50 Ppd.**
Replacement bulb **No. 41,920 $6.50 Ppd.**

Low-Cost Neon Glow Lamp

Not as effective as 71,780 above, but if your budget is tight this hard-to-find 3w glow lamp is the one to use for checking flats. Also for stroboscopic illuminations, long-life pilot lamps indicators, etc. Uses 115v AC or DC, regular edison base. 1,000 hr. life expectancy. **No. 41,684 $4.50 Ppd.**

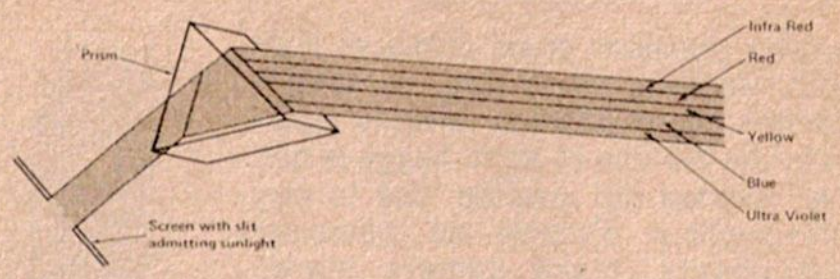
2W Argon Glow Lamp

As 41,684 but 2w Argon. Good low-cost source of ultraviolet light for fluorescence demonstrators or as a light source photo contact printers (near ultraviolet portion of its output is highly actinic with most panchromatic or other photo materials) **No. 41,685 $3.50 Ppd.**

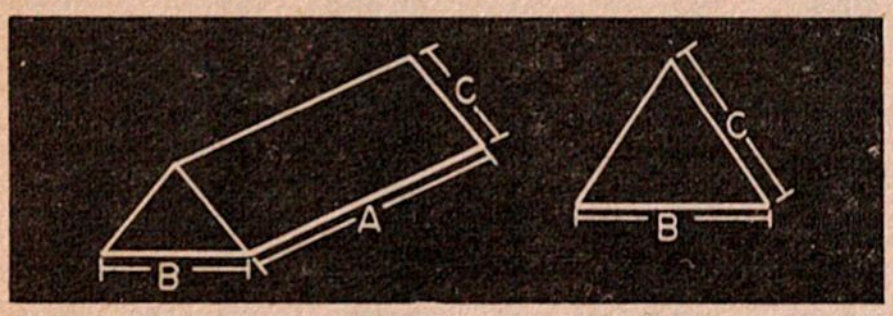
DON'T MISS OUR LASERS, PAGES 151-154.

What Are Prisms?

A prism is a transparent body (most often glass) that can reflect, refract, or disperse light (as into the spectrum). Used in many optical instruments to erect, revert, and rotate images, etc. Often hard to get, especially during war time, we have stockpiled a large variety of war-surplus and manufacturer's-surplus prisms and sell them at **below** manufacturing costs.



How To Order The Size You Need



The above drawings will help you visualize the sizes of our prisms. B=width of base; A=length of base; C=height of face.

Right-Angle Prisms

Right-angle prisms are most often used when light deviations of 90° are needed. Top and bottom images are the same; right and left sides are reversed. Used in binoculars, telescopes, transits, opaque projectors, etc.

Right-Angle Prisms Available

Some are slight seconds, some perfect . . . all at bargain prices. B, C and A are in mm.

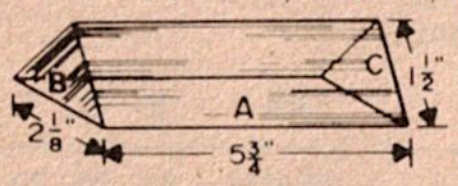
No.	Pr. Ppd.	B	C	A	Comments
30,575	$2.50	8	7	7	
30,576	3.50	18	13	13	
41,008	2.25	19	12	11	
3301*	5.50	21	15	15	
3309	5.75	21	15	15	Silvered
40,733	2.00	23	20	37	15mm cut off base
30,577*	5.75	25	19	19	
40,604	3.00	29	20	21	
3072	1.75	30	19	13	Miniature porro prism
40,995*	6.25	36	25	25	
30,632*	9.75	40	29	29	
3057	2.00	42	27	20	Porro Prism
40,865	4.00	43	29	20	Round corners
3312	1.75	43	27	20	Silvered; round corners
41,002*	10.75	43	31	31	
40,606	2.00	48	27	16	
3273	4.25	49	35	32	Light flint glass
3073	2.00	49	35	25	
40,866	3.00	53	35	25	Round corners
41,003*	17.25	53	38	38	
804	2.75	53	38	102	Second grade; plain
805	2.25	53	38	102	Secondgrade; silvered
801	3.95	53	38	146	Better grade; plain
800	3.25	53	38	146	Better grade; silvered
808	1.50	54	38	28	
3274	1.50	54	38	28	Silvered
809	2.00	54	38	38	
3275	2.00	54	38	38	Silvered
3147	1.75	55	38	26	Silvered
3169	5.00	57	40	41	Light flint glass
3299	5.00	67	48	48	Cut corners on face
810	4.50	69	49	54	
3249	6.50	69	49	54	Silvered
807	8.50	69	49	167	Ctd., mtd., silvered
806	6.00	69	49	167	Second grade; silvered
41,004*	30.26	71	51	51	
60,649*	52.50	89	63	63	
60,233	22.50	90	63	93	¼ wave
3076	6.00	91	64	41	Light flint glass
60,650*	108.50	108	76	76	
71,858	75.00	124	89	89	Silvered

*Available in large, continuing supply for manufacuters.

See page 133.

Giant, Right-Angle Prisms

90-45-45° prisms. Finely ground and polished. Used by the Army in tank periscopes. Normally, prisms like this would retail for $15.00 to $60.00. May have chips and minor flaws. All are size B-53, C-38mm, A-146.

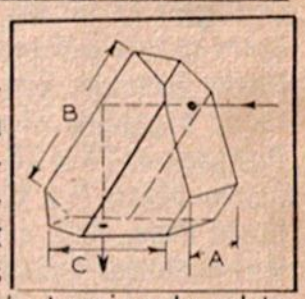


One of the most interesting experiments you can make with a plain prism is to project the spectrum. They are useful for experiments, classroom demonstration at high schools, colleges, camera clubs, etc.

No. 800	**$3.25 Ppd.**	Better Grade Silvered Prism.
No. 801	**3.95 Ppd.**	Better Grade Plain Prism.
No. 802	**2.25 Ppd.**	Second Grade Silvered Prism.
No. 803	**2.75 Ppd.**	Second Grade Plain Prism.

For even larger tank prisms, see Nos. 806 and 807 in adjacent column (B-69, C-49, A-167)

Amici Roof Prisms



Amici Prisms do 2 things: erect image and bend line of sight through a 90° angle. Excellent as prism diagonal in refractor astronomical telescopes because they permit terrestrial viewing. In spotting scopes they made viewing possible by merely turning head to one side.

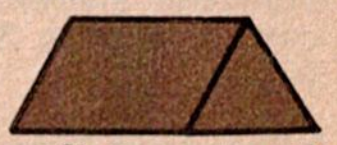
No.	Pr. Ppd.	B	C	A	Comments
3088	**$2.00**	13	11	10	Corrected roof 120° angle
3106	**2.50**	16	15	14	Corrected roof.
3038	**2.50**	34	20	18	Corrected roof.
3003	**3.50**	41	21	22	Corrected roof.
3002	**1.50**	41	21	22	
3225	**6.50**	48	33	36	Corrected roof-80° angle.

SALE! Giant Amici Roof Prism

Cost Government About $80.00 . . .
Cost YOU Only $11.50

Use to make a telescope, project 35mm slides or movies on ceiling for bedridden patient, as a star diagonal on refracting telescope (to get right-side-up image). Bends light 90° & erects image. Heavy brass mount (easily removed) 18 oz. Size (without mount) B-53mm, C-36mm, A-40.5mm. Clear aperture 32mm. **No. 70,826 $11.50 Ppd.**

60° Equilateral Prisms



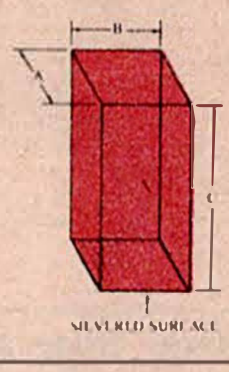
Quality prisms for school use.

No.	Price Ppd.	Face Size	Length
30,294	$2.95	1"	2"
30,295	5.95	1"	3"
30,296	6.75	1"	4"
30,297	9.95	1"	6"

BINOCULAR REPLACEMENT PRISMS

No.	Price	Binocular	Prism Sizes, mm	Coated
5114	$4.00 Ppd.	7 x 50	B-51.5, C-35.A-25	Yes
41,711	4.00 Ppd.	7 x 50	B-63, C-42, A-31	No
5211	4.00 Ppd.	6 x 30	B-43, C-26, A-21	Yes

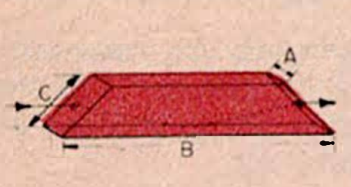
Large Rhomboidal Prism



Surplus precision prism displaces light path (image) according to length (56mm). Image position remains parallel to the old line of sight. Image is neither reverted nor inverted. Use to vary inter-pupilary distance on binocular instruments, make camera stereo adapters, stereo viewers, etc. Size: A-32, B-30, C-56. **No. 40,816 $7.50 Ppd.**

Dove Prisms

Look through the prism and rotate it about a longitudinal axis, the image rotates through an angle twice as much as the prism. Excellent for trick movies.

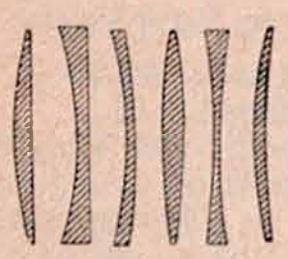


No.	B	C	A	Pr., Ppd.
40,918*	42	20	20	$5.25
40,917*	51	22	23	5.25
3028	75	25	18	6.50
60,236†	99	49	39	12.50

*Rounded Corners †Ctd; silvered; hypotenuse grooved

Miscellaneous Prisms For Experimenters

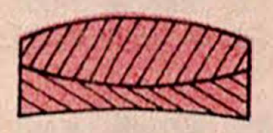
Cube. Polished on four sides.
6.7 x 6.7mm high. **No. 3305 $1.25 Ppd.**
13.5 x 9.4mm high **No. 3293 $2.50 Ppd.**
Octagon (8 faces) 7.9 x 5.5mm. Diameter 13.5mm. For 8mm movie editors. **No. 3288 $1.25 Ppd.**
Porro System. Entrance faces measure 21 x 21mm. **No. 30,279 $4.95 Ppd.**
Pentagon. 24 x 28 x 9mm **No. 3210 $1.50 Ppd.**
Porro-Abbe. 9 x 12mm. **No. 3006 $0.50 Ppd.**
Light Pipe. 5x5, 2.5x2.5x48mm. **No. 3286 $1.00 Ppd.**
Rangefinder Ocular Assembly **No. 3070 $6.00 Ppd.**
Borescope. 13 x 13 x 43mm. Mtd. **No. 3307 $2.00 Ppd.**
80-50-50°. 16.5 x 17 x 14mm. **No. 3296 $1.50 Ppd.**
Porro. Tapered B-60, C-39, A-22 **No. 3219 $3.00 Ppd.**
Penta Roof. 36 x 28 x 50mm. Silvered and coated. **No. 3259 $5.00 Ppd.**
Penta 4 x 8 x 8mm, silvered. 5 sides reflect light rays at 90° angle by 2 reflections. Erect image. **No. 30,355 $9.95 Ppd.**



Demonstration Lens Set

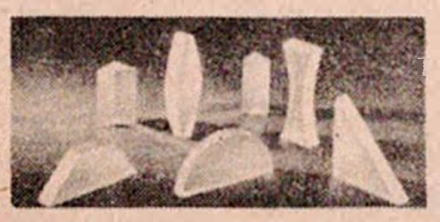
NDEA approved; plano-concave, convex-concave, double concave, concave-convex, double convex, and plano-convex. 50mm dia. 8" F.L. **No. 40,414 $18.00 Ppd.**

Cutaway Section of a Large Achromatic Lens



Demonstrates how the achromatic lens works. It clearly shows the flint and crown elements. Size: 85mm long, 22mm thick, 353mm F.L. War Surplus. **No. 6385 $1.00 Ppd.**

A Right Angle Prism for $1.00? See page 24.



7-Piece Prism/Lens Demo. Set

For easy-to-understand demonstration of the basic principles of optics, this set contains 7 precision cut prisms and lenses: double-convex lens; double-concave lens; plano-convex lens; two 90° prisms; and dove prism. All pieces large and hefty. 9½ x 7" styrofoam box. **No. 71,181 $26.50 Ppd.**

Flat Glass . . . Surplus Bargains!

War surplus circular pieces of optically flat glass, ground and polished, both sides parallel. Made for instrument reticles, optical windows, etc. they have to be good. Cost Gov't. $2.00 or more apiece.

Stock No.	Diameter In Mms.	Thick. Mms.	Stock No.	Diameter In Mms.	Thick. Mms.
The Following 50¢ Each			**The Following 75¢ Each**		
30,648	4.5	1	2199	27	1
2074	5.1	1	30,468	33	2.4
2075	6.9	1	30,582	34	3
2187	8.2	2	2093	35.9	3
40,216	9	5	30,454	37	3
40,221	10	2	30,451	37	6
2105	12.5	1.5	2184	38	3
30,581	13	5	2207	40	1
2080	16	3	2193	40.5	5
2082	17	2	2065	41	8
2098	18 x 18	2	30,661	45	2
30,469	18.5 x 12	2	2209	53 x 113	7
30,650	19	5	2069	54 x 75	3
2083	19.5	2.9	40,262†	57 x 74	4
2203	21	1	**The Following $1.00 Each**		
2084	21	2	2191	57.5	6
2099	21 x 46	3	2070	63	3
2086	22.9	8	**The Following $1.50 Each**		
30,500	24 x 34	3	60,055	150 x 192mm; L.O.F. Twin polished glass	
2206	27	2	**The Following $3.50 Each**		
2089	27.4	3	41,746	110	6.4
2186	29	3			
2091	30	2			

†Cut Corners

Ground Glass

Glass finely ground on one side to give good light diffusion. Excellent for camera viewing screens, rear projection screens, enlargers, etc.

No.	Size	Thick.	Price, Ppd.
30,493	1-1/32 x 1-11/16"	13/63"	$0.50
30,456	1-3/8 x 2"	1/8"	.65
30,665	2-3/16" sq.	1/16"	.65
2143	2¼ x 3¼"	1/16"	.75
2144	3¼ x 4¼"	1/16"	.70
2148	4 x 5"	1/16"	1.25
2146	5 x 7"	1/16"	1.00
60,120	7 x 7"	1/16"	1.00
2147	8 x 10"	1/16"	2.45

Opal Diffusing Glass

Similar to ground glass, but one surface is flashed with a milky white "opal" covering to diffuse light evenly. 4 x 5 x 1/8" thick. **No. 2149 $1.75 Ppd.**

Heat Absorbing Glass

Used between bulb & condensers to protect optics & slides from excessive heat.

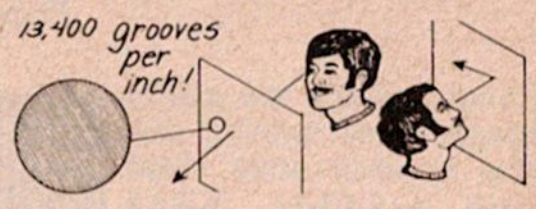
Size (")	Thickness	No.	Ppd.
1-15/16 dia.	¼	4072*	$1.50
2 x 2	¼	4010	.50
2-5/16 dia.	5/32	4063	.50
4 x 5	¼	4009	.65
2 dia.	¼	40,206	.50
2-3/8 dia.	1/8	40,207	.75

*Made of specially tempered heat-absorbing glass that withstands high temperatures without breaking. Manufacturing results in a number of bubbles which do no harm. Other glass listed should not be used without blower with bulbs over 150 watts.

8-Prism Set. Set of 8 war-surplus prisms. Government paid over $100.00. If you purchased them individually they would cost about $10.00. Various sizes and types such as: porro, roof, pentagon, etc. Precision pieces. **No. 60,407 $5.00 Ppd.**

DIFFRACTION GRATING

Amazing Diffraction Grating Creates a Rainbow of Color



Diffraction grating has thousands of microscopic grooves per inch breaking up white light into all the colors of the spectrum. This phenomenon is called "diffraction." Years ago replicas were available only in small sizes and cost about $5.00 a square inch! Now we offer two types of attractive film (acetate plastic) replicas at very low prices. It has 13,400 grooves per inch (length wise), 8½" wide (7½" grooved) x 0.005" thick. Dispersion of light is 24°.

Two Types: (A) Transmission: See rainbow through clear film; **(B) Reflection:** Thin aluminum coating reflects rainbow.

Decorate: Tape transmission type on window; see out as sun creates beautiful rainbow through grating. Sandwhich between glass or plastic for wall panels, table tops, skylights, signs. "Idea Book" has many fun ideas.

Photographers: Create unusual rainbow shots with transmission type in front of lens. Reflect a rainbow background or use in fancy titles and slides.

Teachers: Economical; give some to each student. Fine for Science Fair, homemade spectroscopes, science, physics or art classes, etc.

Industry: Used in metrology, spectroscopes, displays, packaging, etc. Test microscope resolving power.

Make Jewelry: Fascinating, dazzling, colorful jewels.

"Diffraction Grating Idea Book"

Shows how to use the rainbow in decorations, displays, photos, etc. Pprbk; 8½ x 11". **No. 9064 50¢ Ppd.**

Sheets and Rolls of Grating All 8½" Wide

*Includes 1-page idea sheet	Transmission No.	Price Ppd.	Reflection No.	Price Ppd.
8½x11" Sheet	40,267*	$ 1.50	50,201*	$ 2.50
6-Ft. Roll	50,180	5.95	50,203	10.95
25-Ft. Roll	70,565	21.25	70,566	38.75
100-Ft. Roll	70,567	70.00	70,568	127.00

Combination. Two 5½ x 8½" sheets, one each transmission & reflection grating. **No. 50,202* $2.45 Ppd.**

Diffraction Skin Jewels—Self Adhesive

They break up light into rainbow colors. Salesmen use them as "door openers," airline stewardesses & Playboy bunnies enjoy getting them, parties perk up with rainbow favors. Place on skin or clothing. Colors change with movement.

Pkg. of 12 **No. P-41,294 $4.00 Ppd.**

Card-Mounted Diffraction Viewers

Transmission Type in 2 x 2" Mounts. These have 1 square inch of diffraction grating exposed.

No. 40,272 One slide only. **25¢ Ppd.**
No. P-30,282 Forty in plastic container. **$4.50 Ppd.**
No. P-50,183 One hundred in container. **$10.00 Ppd.**

Diffraction Art Foil

Has one aluminized side embossed with fine, concentric lines (14,000 per in.) that break up light & reflect many rainbows. Roll or self-adhesive sheets for decorating, signs, displays, plaques, etc.

3 Sheets (6 x 6", self-adh.) **No. P-41,358 4.00 Ppd.**
10-Ft. Roll (6" wide) **No. 60,830 11.00 Ppd.**

Experimenter's and Designer's Kit

For home experiments and color photog. Incl: two 5½ x 8½" sheets (one transmission, one reflection grating); 4 assorted, self-adhesive, circular-patterned gratings; double-faced tape strip; two 1" dia. pieces of mounting glass; one 2 x 2" card viewer for each grating; "Idea Book". **No. 70,563 $5.75 Ppd.**

INSTRUMENT QUALITY DIFFRACTION GRATING FOR RESEARCH & SCIENCE

Low-Cost, Instrument-Quality, Plane Reflection Grating Replicas . . . 15,000 & 30,000 Grooves/Inch

Replicas on aluminized glass blanks, reproduced from extremely high-quality, imported masters which were ruled on an interferometrically controlled ruling engine. Well blazed and suited for use in monochromators and other instruments. Low cost plus high quality, ideal for instrument makers and labs, students and schools.

Grooves per inch (approx.)			15,000 (600/mm)		15,000 (600/mm)		30,000 (1200/mm)		30,000 (1200/mm)	
Blaze Wave Length			4,000 Å		5,000 Å		2,400 Å		4,000 Å	
Size Inches	Groove Length	Ruled Width	Stock No.	Price Ppd.	Stock No.	Price Ppd.	Stock No.	Price Ppd.	Stock No.	Price Ppd.
½ x 1"	½"	1"	41,021	$22.00	41,030	$22.00	41,039	$30.00	41,048	$30.00
1 x 1"	1"	1"	41,019	30.00	41,028	30.00	41,037	40.00	41,046	40.00
2 x 2"	2"	2"	41,016	50.00	41,025	50.00	41,034	60.00	41,043	60.00
4 x 4"	4"	4"	41,013	120.00	41,022	120.00	41,031	180.00	41,040	180.00

Instrument Quality Concave Grating

Low-cost replica glass grating suitable for serious instrumental use. Ground and polished to optical surface, aluminum coated, 15,000 lines per inch surface ruled. Reflects ultraviolet light. Concave, can be used in uncollimated light. 3" dia. x 3/8" thick. Ruled area 1½ x 1½". Blaze wavelength 4000Å. Radius 100 cms.

No. 50,220 $85.00 Ppd.

1000-Line/In. Metalized Grating

High-quality, 1000 lpi metalized grating in 2" x 2" x .075" glass slide. Many uses; esp. in metrology and microscopy. 50-50 ratio of black and clear parallel lines. One line per .001". **No. 30.609 $54.00 Ppd.**

Before you spend a lot of money for special-made optics, always check our catalog first. We might have it!

Helpful Books On Optics

"Fun With Optics." Building optical instruments inexpensively: telescopes; microscopes; magnifiers; binoculars; etc. 32 pp. 8½ x 11". Illus. **No. 9050 50¢ Ppd.**

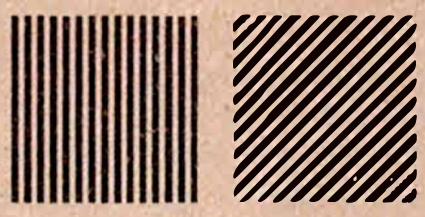
"How To Condense & Project Light" Uses of condensing lenses in spotlights, projectors, beacons. 32 pp. **No. 9044 75¢ Ppd.**

"Optics & Optical Instruments" by B. K. Johnson. Applications of optical principles . . . the eye, F. L. measurements, scopes, optical glass, etc. Pprbk. 224 pp. (5½ x 8"). **No. 9300 $2.50 Ppd.**

"Applied Optics & Optical Design" by A. E. Conrady Study & design of optical systems, high-power microscope & anastigmatic photo objectives. 2-Vol. Set, ea. 5-5/8 x 8-3/8"; 851 pp., illus., pprbk. **No. 9353 $8.00 Ppd.**

"Optics Experiments & Demonstrations" by C. Harvey Palmer. 59 experiments. Incl. ray, wave, polarization & crystal optics; spectroscopy. Pprbk. 340 pp. 8½ x 11". **No. 9358 $6.50 Ppd.**

Ronchi Rulings Etched on Glass

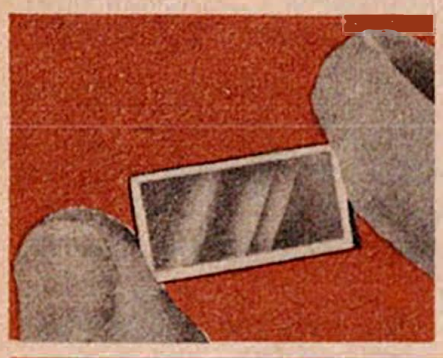


Ronchi rulings are evenly spaced lines running parallel to each other, filled with baked-in, black opaque. Line width equal to space width next to it. When 2 rulings are placed in contact at rt. angles, spaces between lines become perfect squares. Typical uses incl.; in printing & engraving to form halftones from photo prints; in optics to make light gates, for testing lenses for surface flatness, as wavelength scale in spectroscope; in lab for measuring & calibrating with microscope. Excellent for creating Moiré patterns; see page 103.

***IMPORTANT NOTE!** Rulings 45° to edge on all sizes 80 to 150 lines per in. Those 200 thru 300 lines per in. ruled either 45° or parallel to edge. **Please state choice, and if other is acceptable in event we cannot ship your choice.**

Lines/In.	No.	Price Ppd.
1 X 1" Size		
50	30,511	$1.65
80	30,512	1.65
100	30,513	1.65
133	30,514	2.30
150	30,515	2.30
200†	30,516	2.30
250†	30,517	3.30
300†	30,518	3.30
†Sorry, no choice of ruling.		
4 x 4" Size		
50	40,651	$22.00
80	40,653	22.00
100	40,655	22.00
133	40,657	31.25
150	40,659	31.25
200*	40,661	31.25
250*	40,663	44.00
300*	40,665	44.00

Lines/In.	No.	Price Ppd.
2 X 2" Size		
50	40,650	$6.50
80	40,652	6.50
100	40,654	6.50
133	40,656	9.20
150	40,658	9.20
200*	40,660	9.20
250*	40,662	13.00
300*	40,664	13.00
6 X 6" Size		
50	40,668	$49.50
80	40,669	49.50
100	40,670	49.50
133	40,671	69.25
150	40,672	69.25
200*	40,673	69.25



Optical, Multi-Layer, Dielectric Interference Filters • High Quality • Popular Wavelengths

These are high quality passband interference filters offered in the most popular wavelengths. All are blocked from 100.0nm (1,000Å) through 10,000nm (100,000Å). For use with lasers and Osram or mercury vapor lamps, to single out a particular spectral line. Transmission outside the passband is less than 0.01% for all wavelengths. Each filter available in ½ x 1" or ¾ x ¾" size. Tolerances: center wavelength ±0.2%, H.B.W. ±0.15%.

nm Wavelength	$8.00 each Ppd. ½" x 1"	$8.75 each Ppd. ¾" x ¾"	nm H.B.W.	% Trans.	Comments
405.0	30,688	30,704	9.2	40	Mercury Line Filter
435.8	30,689	30,705	7.4	50	Mercury Line Filter
450.0	30,690	30,706	6.5	50	Mercury Line Filter
457.9	30,691	30,707	6.8	50	Use w/He-Cad Laser
488.0	30,692	30,708	7.2	50	Use w/Argon Laser
500.0	30,693	30,709	7.4	50	Use w/Argon Laser
514.5	30,694	30,710	8.0	50	Use w/Argon Laser
546.1	30,695	30,711	8.8	50	Mercury Line Filter
550.0	30,696	30,712	9.2	50	Mercury Line Filter
577.0	30,697	30,713	9.8	50	Mercury Line Filter
589.6	30,698	30,714	10.0	50	Sodium Emission Line
600.0	30,699	30,715	10.1	50	Sodium Emission Line
620.0	30,700	30,716	10.6	50	Mercury Line Filter
632.8	30,701	30,717	11.1	50	Use w/He-Ne Laser
650.0	30,702	30,718	11.4	50	Use w/He-Ne Laser
690.0	30,703	30,719	12.1	50	Mercury Line Filter

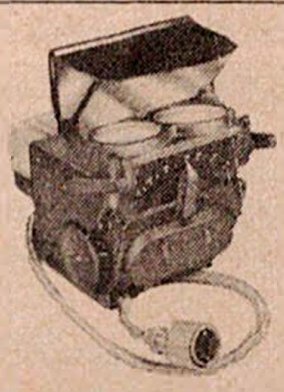
Dichroic Filters For High Color Saturation

Amazingly beautiful thin interference filters on glass 2 x 2 x 1/16". Experiment at various angles, watch them change color, showing their ability to block out certain wavelengths of light. Put in a projector's slide gate to make a color spotlight that will emit "purer" colored light than ordinary color filters. **$3.10 ea. Ppd.**

Red No. 30,634 **Blue** No. 30,635
Green No. 30,636 **Yellow** No. 30,637

4 Tiny Dichroic Filters, slight rejects, but can be used as effectively as those above. Asst. sizes and shapes from ¼" dia. up. **No. P-30,641 $2.75 Ppd.**

Surplus Reflex Gunsight



Navy MK-18 cost about $1000! Contains valuable motordriven gyroscope with rotating first-surface mirror (2-1/8" dia.). 2 (180mm F.L., 52mm dia.) anchromatic lenses; neutral-density filter; reticles; etc. When illuminated you see image of 2 reticles projected into your line of sight. One is a small crosshair; other a 6-point adjustable star. 7 x 5½ x 7¾". Wt. 8 lb. **No. 70,711 $17.50 Ppd.**

Do-It-Yourself Collimator Kit

Includes the 35-pg. booklet "The Optical Bench"

With this kit you build a high-quality, accurate collimator! No special tools needed, and you can use scrap wood. Then you can: make an infinity target; etc. Kit consists of 2" dia., 20" F.L. achromatic lens; 2¾ x 2¾" film target reticle; 1 piece each of 2¾ x 2¾" ground glass, clear glass; and 35-pg. "The Optical Bench." **No. 71,529 $17.50 Ppd.**

Powerful Searchlight (Mangin) Mirror

Glass ground and polished on both sides with radii of curvature calculated to cause reflected light to leave reflector in an intense parallel beam. Rear surface silvered. No drilled holes. Ideal for spotlights, reconditioning antique car headlamps, etc. 2-31/64" dia. F.L. 3-5/32" **No. 41,007 $3.00 Ppd.**

Large-Size, Low-Cost, Plastic Fresnel Lenses

Fresnel lenses are practical and a lot of fun . . . whether used to build a money-saving overhead projector, as a large area magnifier, or an unusual trick photo gimmick. But what is a Fresnel lens? It is a flat, thin piece of plastic on which are molded a series of small concentric stepped zones. They extend from center to outer margin. Each groove is a minute refracting facet capable of bending light. Its transmittance (ability to pass light) is greatly increased over that of a conventional lens of the same focal length. Thus a large diameter, lightweight and inexpensive lens with a short focal length is possible. They have countless uses: solar energy furnaces; burning glasses (newspaper burns in less than 1 min.); ground glass image brighteners, place behind ground glass in view cameras, contour projectors, etc.; condensing lenses in overhead projectors; etc. See our wide selection below, especially our popular 10½" sq. lens!

No. 70,670 $4.00 Ppd.

"Fun With Fresnel Lenses"

Plans and instructions for building an Image Brightener. Solar Furnace, Camp Cooker, Overhead Projector, and Camera Obscura each requires only one Fresnel lens. These projects are great for Scouts, Hobby Clubs, and "Shop." Build an Overhead Projector worth $175, for a total cost of only about $40! Illus.; 8½ x 11"; 16pp; paperback. **No. 9053 40¢ Ppd.**

Plastic Fresnel Lenses

Size	Thickness	Focal Length	Lines/In. (approx.)	Stock No.	Price Ppd.
2-1/8 x 2¼"	1/16"	3"	215	30,389*	$2.75
3 x 3¾"	1/16	9½	77	40,709	4.58
4 dia	1/16	2-7/8	100	41,663	1.95
4 x 5	1/16	8½	50	41,351	4.25
5 x 7	1/16	8½	50	41,352	4.60
5½ x 6	1/16	8½	50	40,803	6.50
6 sq.	3/32	10	110	40,954	9.50
7-5/8 x 9-7/8	1/16	13½	50	60,498	6.50
8 x 10	1/16	8½	50	60,826	4.75
10½ sq.	1/16	13½	50	70,670‡	4.00
10½ sq.	1/16	8½	50	71,315	4.00
11 sq.	5/32	8	55	70,879†	12.00
11-1/8 sq.	3/16	5½	50	71,316†	7.50
11-3/16 sq.	1/8	5½	50	70,669†	7.00
11¼-sq.	3/32	16	55	70,877	6.00
11½ x 16-1/8	3/32	19¾	65	60,500	10.00
11-7/8 sq.	3/32	8½	50	71,305	4.25
11-7/8 sq.	3/32	13½	50	70,533†	4.00

*Use over ground glass of twin lens reflex camera. †Cemented double lenses. ‡Includes "Fun With Fresnels."

Large Plastic Fresnel Lenses

For larger overhead projectors and solar funaces with higher BTU output. 0.125" thick; rounded corners.

16½ x 21-1/8	1/8	24-1/64	70,716	$22.75 Ppd.
19¼ x 24¾	1/8	24-1/64	70,717	29.50 Ppd.

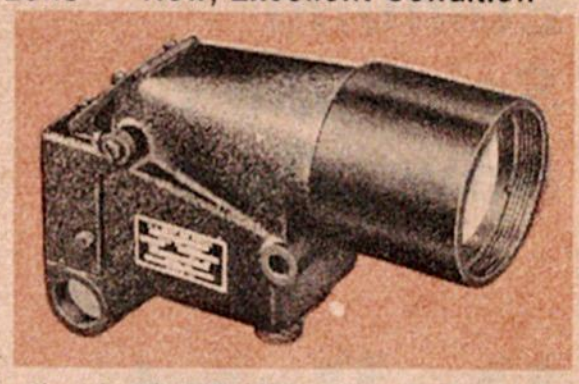
Flexible Wide Angle Fresnel

Turn any limited view into a panoramic scene! Increase field of vision for security. Great at parties . . . turn & twist for crazy distortion effects. Photographers use it for wide-angle, fish-eye & distortion shots. Mount on a window & get a wider view; pull to remove; leaves no mark. Plano concave 11" dia.—12" F.L. Asphericized to eliminate spherical abberation. Optical grade polyvinyl chloride. Incl. 16-page "Fun With Fresnel Lenses" booklet.

No. 71,542 $5.25 Ppd.

Collimator or Parallel Light Source

• Original Govt. Cost Approx. $100.00 . . . Now $9.95
• f/2.5 Achromatic Lens • New, Excellent Condition



Made for use as a special purpose gunsight (N3C), it is essentially a collimator or source of parallel light. Has opaque metal reticle with precision .010" center pinhole and outer ring; 2" dia. 5-3/8" F. L. achromatic lens; small first surface mirror. 28v input, each filament of this dual filament lamp operates on 14v. 2¾ x 5 x 6¾". Sturdily built with 2 sets of convenient mounting lugs. Objective lens in threaded cell, adj. for focus with spanner wrench.

Useful in production and research for: collimator and parallel light source; adjusting telescopic riflesights; determining parallelism of plane surfaces; setting up a form of template; machine shop angular relationships; determining shape or curvature; making directional measurements and adjustments; adjusting or realigning binoculars. Incl. directions for making bench and vertical collimators, adjust gunsights, determine curves and template set-ups, align binoculars. Wt. 2 lb.

No. 70,774 $9.95 Ppd.

Mazda Lamp for above. Frosted exit ¾" dia. Single filament operates on 12-16v at approx 1.3 amps. Rated at 21 candle power. **No. 41,503 $1.50 Ppd.**

"Collimators and Collimation". Comprehensive, easily understood booklet written by technician. Describes different kinds of collimators. 8½ x 11", 36pp. Approx. 50 drawings. **No. 9072 $1.00 Ppd.**

Deluxe Optical Alignment Telescope

Focuses 20" to Infinity. Versatile, accurate for aligning jigs, fixtures, radar antennae, towers, & like structures requiring precise positioning. Power at infinity 6X; at 20" 9.3X Wide (10°) field at infinity. Fine 90° crossline glass reticle. Excellent light gathering power. High quality optics incl. slide-focusing, coated achromatic objective 51mm. dia. with 180mm F. L. Locking screw. Slide focusing 4-element eyepiece 30mm F. L. 60° apparent field. Alum. body. 2¾" O. D. x 10¼" (w/o eyeguard),—extends to 14-5/8". Easily mounts on V blocks (not incl.) or use our single base, 2-ring mount No. 70,079 (see page 73). Wt. 34 oz. **No. 70,674 $103.50 Ppd.**

Auxiliary Telescopes With High Quality Optics

• Draw Tube Model For Close Focusing
• Zero Model For Adjusting, Focusing, Checking Or Collimating Instruments

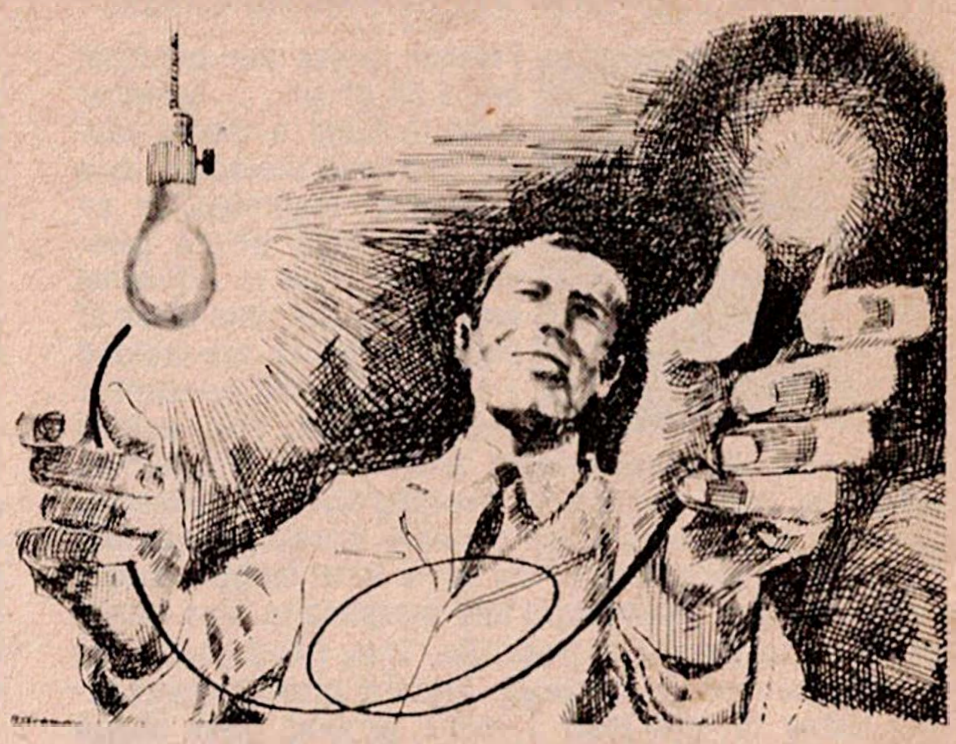
Low priced! Use for alignment, measurement, and observation. View dials at a distance, use as optical bench components, as finders on scopes, etc. Unmounted, with aluminum body (1½" O.D.) for use in "V" blocks or standard lab clamps. Both give sharp definition over entire field. 32mm dia. coated achromatic doublet objectives. Kellner eyepieces in focusing mounts w/diopter scales & rubber eyecups. Magnification: 6.1x at infinity (inverted images). Instr.

Auxiliary Close-Focusing Telescope With Reticle. Focuses from 12" to infinity. Eyepiece contains a precision etched glass crossline-type reticle with center markings. 10½" long. **No. 60,941 $30.00 Ppd.**

Zero Telescope. Hard-to-find optical adjustment tool, factory zeroed at infinity. Supplied without reticle or drawtube. 6-7/8" long. **No. 60,934 $19.50 Ppd.**

Edmund Scientific Co. Now offers

DuPont CROFON® Fiber Optics



Through the principal of fiber optics, DuPont's CROFON plastic light guides bring a rare adventure to the experimenter and hobbyist.

With CROFON, it is now possible to bend light around corners, create multiple lights from a single source, carry light into locations heretofore difficult, costly and sometimes impossible. By multiple reflection, light travels through the transparent core of each fiber in a zig-zag path from end to end.

These new plastic light guides are tough and flexible, costing anywhere from one-fifth to one-tenth as much as some glass fiber optics.

Durable CROFON light guides can be used in appliances, toys, signs, optical and electronic equipment, displays—even light signals on model train layouts. Used with photocells, they can count, select, detect or sort.

Complete Experiment Kit

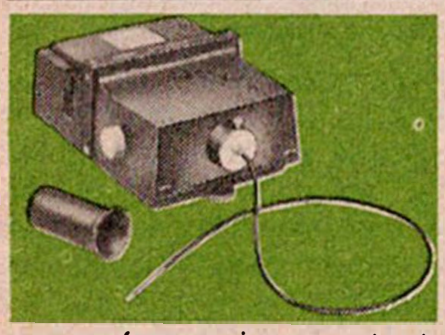
Two 2-ft. long DuPont Plastic Light Guides—one with 16 and one with 64 fibers (the latter transmits 4 times as much light). With concentrating lens, portable penlight-type light source (less batteries), rubber adapter for connecting guides, one 5-ft. length 20 mil Crofon fiber, two 5-ft. lengths 10 mil Corfon fiber. Also all materials needed to polish, color and cap the ends: epoxy cement (two ¾-oz. tubes); 2 oz. of 600 alundum abrasive; 2 oz. of red jeweler's rouge; 50 ml capping solution and ¼-oz. packets of red, yellow and blue dyes for color coding ends. Complete instructions.

No. 70,855 $10.25 Ppd.

Capping Solution only. 50 ml. **No. 40,949 $2.00 Ppd.**

Dye Set only. Three 1-oz. Packets.

No. 40,948 $4.25 Ppd.



Fiber Optics Illuminator

Concentrated illumination source for flexible light guides. Blower cooled, thermostat protected, 500-watt projection lamp provides an intense light source for maximum output, and a solid state controller allows continuously variable light control. Rated lamp life at full voltage 25 hours (longer at reduced output). Adapters incl. for fiber bundle diameters of: 1/2, 3/8, 10¾" is an adaptation of the Edmund V.E. Projector and includes projection lenses, etc. which allows its use as a standard 35mm slide projector.

No. 71,502 $55.00 Ppd.

Replacement Lamp **No. 41,154 $5.65 Ppd.**

Plastic Fiber Light Guides Only. Minimum order 2 ft.

Stock No.	Price per foot Ppd.	Dia.	No. of Fibers	Minimum Radius of Bend	Light at End Sq. Inches
2504	**50¢**	.087"	16	¼"	.001
2505	**55¢**	.110"	32	3/8"	.002
2506	**60¢**	.119"	48	½"	.003
2507	**65¢**	.130"	64	¾"	.004

Qty. prices for 200 ft. or more. Get bulletin No. 9873

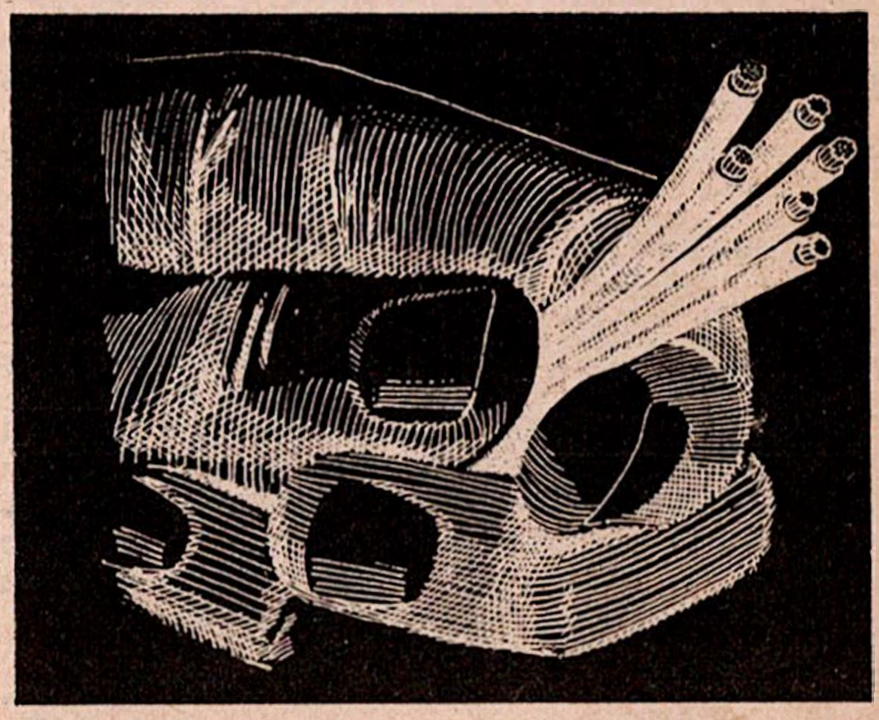
Plastic Fiber Optics Strands Transmit Light . . . 10, 20, 30 & 40-Mil Fibers Plus Kit

Individual strands of unjacketed plastic fiber optics for making beautiful fiber optic trees, bushes, fountains; experiments; construction of light-carrying devices, toys, displays; OEM, etc. Available in diameters of 10, 20, 30 and 40 mil of various lengths on spools for easy measuring and cutting.

10-mil Fiber	**200 ft.**	**No. 41,212**	**$4.75 Ppd.**
	1,000 ft.	**No. 60,779**	**$17.50 Ppd.**
20-mil Fiber	**35 ft.**	**No. 41,214**	**$8.00 Ppd.**
	100 ft.	**No. 41,215**	**$21.00 Ppd.**
	500 ft.	**No. 60,780**	**$93.50 Ppd.**
30-mil Fiber	**25 ft.**	**No. 41,353**	**$5.50 Ppd.**
	100 ft.	**No. 60,827**	**$19.00 Ppd.**
40-mil Fiber	**25 ft.**	**No. 41,275**	**$6.75 Ppd.**
	100 ft.	**No. 60,813**	**$22.50 Ppd.**
	350 ft.	**No. 60,814**	**$63.00 Ppd.**

Sample Kit: 20 ft. of 10-mil unjacketed fiber; 15 ft. of 20-mil unjacketed fiber; four 1-ft. jacketed light guides: 16-fiber, 32-fiber, 48-fiber and 64-fiber.

No. 41,213 $6.75 Ppd.



"PIPE" LIGHT WITH FIBER OPTICS.

Fiber Optics Idea Booklet . . . Only 75¢

100 exciting design and application ideas for fiber optics. You'll be amazed at the many uses of fiber optics. Includes ideas for various industrial, decorative, display, and Science Fair uses. Design your own fiber optic trees! **No. 9095 75¢ Ppd.**

Glass Fiber Optics Light Guides

Now . . . only 25¢ a foot . . . due to recent surplus purchase. Approx. 200 (2.5mil dia.) glass fibers noncoherently bundled in flexible, tough polyvinylchloride jacket (0.087 O.D.). 0.250" typical bend radius; temp. limitations: glass —58 to +1000°F, PVC jacket —58 to +220°F. When polished and capped, will transmit light (from, 400-2000mu) as follows: at 1 ft., 65%; at 4 ft., 55%; at 6ft., 45%; at 12ft., 20%. A real bargain.

Minimum order 4 feet. No. 2516 25¢ Ppd. per foot
Quantity prices available on 500 ft. or more.

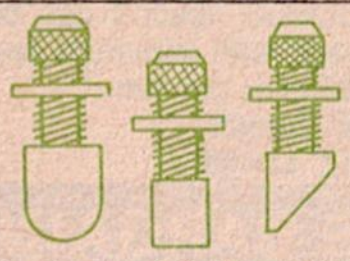
Flexible Plastic Fiber Optics Tube Transmits Images In Full Color

Unjacketed, coherent optic guides consisting of hundreds of flexible, 10 mil, acrylic-clad styrene fibers. Finished ends are clear epoxied in practical, rectangular array. Transmitted image compares in resolution to halftone photo. Light loss 20% per ft. plus 10% ea. end. For use to 175°F. Convey & display numbers, letters, etc. from visually inaccessible locations. Ideal for use in EDP, OCR, instrument readout, etc. Instr. incl.

¼ x ¼ x 12"	**No. 60,783**	**$25.00 Ppd.**
¼ x ¼ x 24"	**No. 60,784**	**$45.00 Ppd.**
¼ x ½ x 12"	**No. 60,785**	**$40.00 Ppd.**
¼ x ½ x 24"	**No. 60,786**	**$75.00 Ppd.**

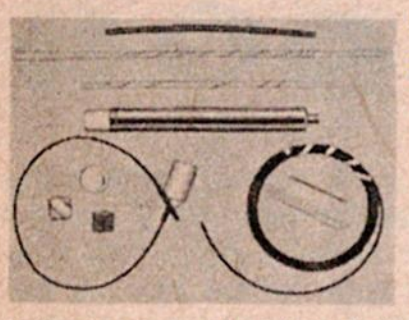
For prices on longer lengths or large quantities, contact our Industrial Sales Dept.

Terminal Lens Set



Precision-molded acrylic Terminal Lenses for your fiber optic project or display. Protect fiber ends from dirt and heat up to 90° C, focus light, etc. Require no fitting; insert bundle and tighten vise; can mount on panels up to ¼" thick. Set of 5.

No. P-41,232 $3.75 Ppd.



Glass Fiber Optics Experiment Kit

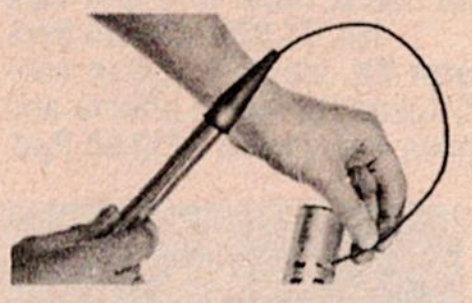
Includes: 2,000 glass fibers; 9" bundle of unjacketed, 2.5-mil fibers (about 600); (12) 6" plastic fibers (20 mil); 5 ft. x .087" dia. coil of PVC jacketed fibers; 1 ft. light guide, polished ends, heat-shrink tips; 1½" coherent rod; 1½" glass rod; heat-shrink material (5"); polished face plate; image stone; ½" dia. glass plate; 5½" long penlight & adapter (requires 2 "A" cells); planoconvex lens; & instr. **No. 71,285 $10.00 Ppd.**

Flexible Fiberscope "Sees" Everywhere

Engineers and QC inspectors can easily check for imperfections, fractures, or other damage . . . in remote, inaccessible (but illuminated) locations or thru pipes or tubes. Hi-resolution image-transmitting device passes through 3/8"+ openings and intricate passages providing clear, wide areas of vision. Inspect remote areas; monitor hazardous processes; or demonstrate fiber optics. Use as a surveillance instrument; or in biological research to observe animals in isolated laboratory conditions. 7X magnifying eyepiece; focuses from less than ½" from the subject to infinity. Field of view: 2" distance, ½"; 2-ft., 5-3/16". Has 1/8" bundle of 4,000 coherently arranged glass fibers (.002"). Semirigid gooseneck sheathing: 18" long; 3/8" dia. **No. 60,857 $40.00 Ppd.**

"Add light to Fiberscope with Flexilight below."

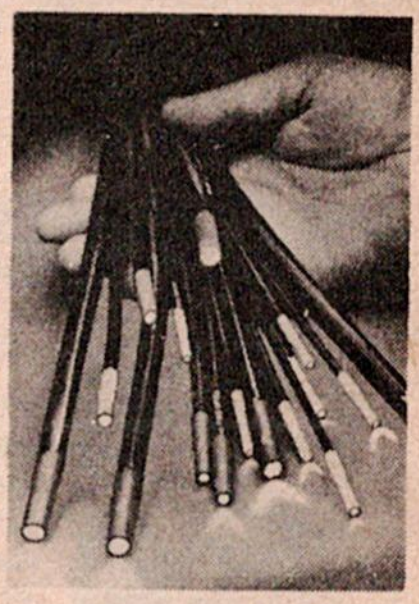
Flexilight Illuminates Inaccessible Areas



2-ft. long, vinyl cased, flexible, plastic light guide (64 fibers) snakes in and around corners, through small holes, etc. Measures .130" O.D.; minimum bending radius ¾"; .004 sq. in. of light surface. Incl.: chrome finish 5½ x 5/8" dia. rotary switch penlight; bulb, rubber centering guide and adapter; and instr. Uses 2 "AA" batteries (not incl.). Wt. 5 oz.

No. 60,648 $2.75 Ppd.
Penlight only. No. 40,900 $1.00 Ppd.

Flexible Fiber Optics Light Guides



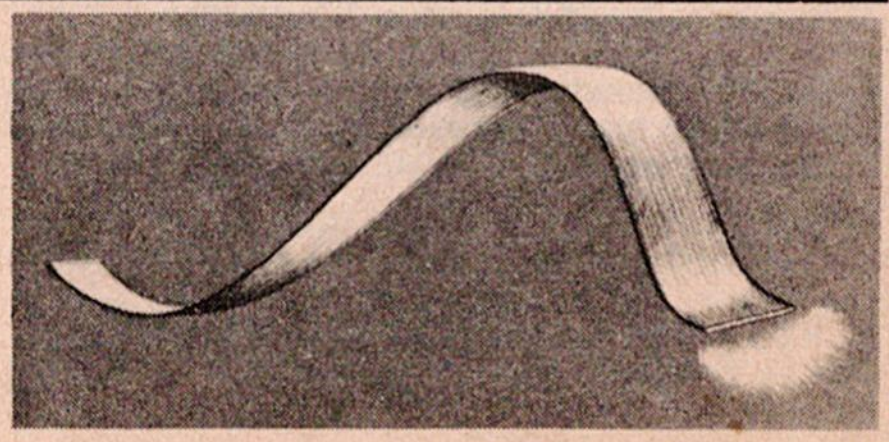
Randomly arranged high-transmission glass fibers sheathed in plastic tubing with epoxy potted, ground and polished ends (with metal tips of 1-1/8" max. length). Each has numerical aperture of .55 and takes a cone of light 60°. About 70% of light striking end enters fibers and about 8% of this light is lost for every foot of length. These guides transmit wave lengths of 400 to 2,000 millimicrons. Unaffected by bending.

No.	Price	Length	Dia.	Min. Radius of Bend	No. of Fibers
40,640	**$13.00 Ppd.**	24"	1/16"	5/8"	490
40,641	**$16.00 Ppd.**	12"	1/8"	¾"	1470
40,644	**$21.00 Ppd.**	36"	1/8"	¾"	1470
40,639	**$21.00 Ppd.**	12"	¼"	1½"	5880

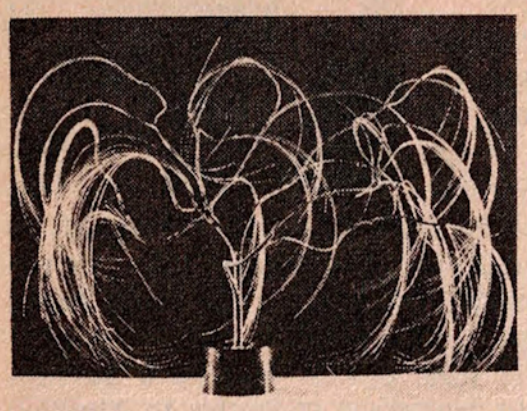
Fiber Optic Ribbon & Sheeting

Flexible, paper-thin, coherent optic sheet is formed of 2-3 mil glass fibers adhesive-bonded approx. 400 per inch. Wide variety of uses in image transmission, especially those requiring change in form: line to raster; line to circle; line to spot; image dissection; etc. Particularly applicable to problems in guidance and target acquisition, position sensing, EDP input data pickup, etc. Instr. incl.

Ribbon (1 x 12" long)	**No. 41,225**	**$11.00 Ppd.**
Sheeting (9 x 12" long)	**No. 60,795**	**$90.00 Ppd.**



Make Your Own Light Creations . . . Design Decorative Fiber Optic Lamps

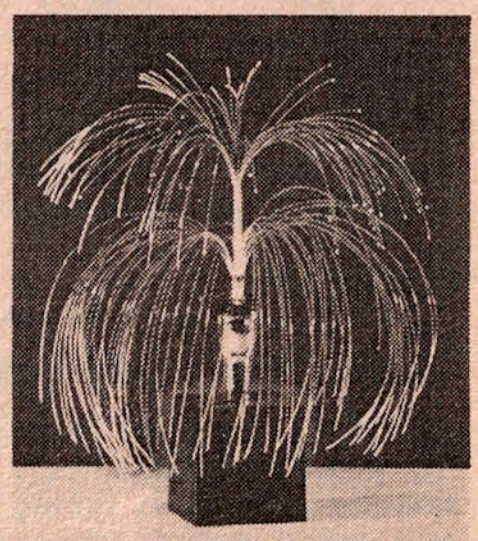


The magic is you . . . and the fiber optic components included in these easy-to-make kits. A single light source at the base transmits light through tiny cascading fibers to emerge as sparkling pinpoints of light at the tips. Create a multi-branched tree that is really a dream or make lighthearted, original conversation pieces with sprays of sparkling lights. Add your own decorator materials such as flowers, ceramic pieces, art and craft materials, etc. Both kits include basic kit of: socket and cord set; night light bulb; plastic base; color filters; and instr.

Fiber Optic Dream Tree Kit (Illus.). A conversation/decorator piece that everyone will admire . . . adds elegant beauty to any surroundings. Basic kit plus: 36" spray of green and gold fibers; floral wire and tape for trunks and branches. **No. 71,629 $14.95 Ppd.**

Fiber Optic Decorator Starter Kit. Ideal for use in centerpieces. Basic kit plus: 3 tubes for tiered effects and 17½" long spray of fiber optics. **No. 71,592 $12.95 Ppd.**

Fiber Optic Display Lamp



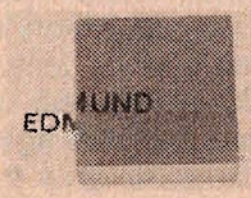
Beautify your den or desk with this unusual, conversation - starting lamp. Plastic fiber optics sprout from black cube and transmit light to their tips. There, each point of light glows attractively and soothingly. 14" high, 3-3/8" sq. base, about 150 fibers. Includes 6v bulb and color chips to add colored light. 110v AC.

No. 71,195 $17.00 Ppd.

Infrared Light Guides . . . Tough & Flexible

NOT AVAILABLE

Ideal for transmitting infrared light to locations thought too costly or difficult to reach. DuPont's CROFON® IRX Fibers (similar to standard CROFON) have a transmission peak at 9000Å with end losses; 50-60% of input light is transmitted through 1-ft. of IRX Fiber (transmits visible light poorly). .08" O.D.; tensile strength: 24Mpsi (almost twice standard); modulus: 227Mpsi; ultimate elongation: 260%; numerical aper.: 0.77; acceptance angle: 100° (standard: 64°); critical angle: 54°. Min. order 2 ft. **No. 2521 75¢ Ppd. Per Ft.**



Surplus F.O. Face Plates

Amazing glass face plates have **over a million fibers** coherently arranged. Place one over printing & words appear on top of face plate. Use them as small rear projection screens, for experiments, etc. Because these are slight rejects, you get them for 1/10 normal price! Polished & unpolished plates available. (Unpolished plates can be polished with a light coat of clear nail polish.) Approx. ¼" thick.

Size	Polished	Stock No.	Price Ppd.
1¼" dia.	No	**41,306**	**$2.00**
1¼" square*	No	**41,308**	**2.00**
1¼" dia.**	No	**41,310**	**2.00**
1¼" dia.**	Yes	**41,311**	**3.00**

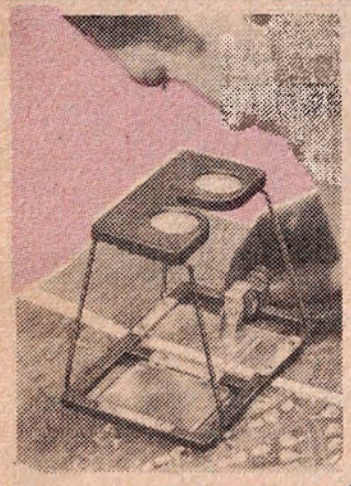
*cut corners **one concave side

Image Conduit

71,000 (.0005" dia.) clad fibers fused together to form a 1/8" rod (or rigid bundle) capable of transmitting an image from one end to the other. It can be bent into complex shapes by heating over a Bunsen burner (or similar torch) and manipulating it as one would a glass rod. Due to the small diameter of the individual fibers it can be bent to angles with very small radii with minimum loss in transmission. Resolution of 80 lines per mm.

6" Length No. 40,642 $5.50 Ppd.
12" Length No. 40,643 $9.50 Ppd.

MORE SURPLUS BARGAINS



Stereo Viewer and Base

NOT AVAILABLE

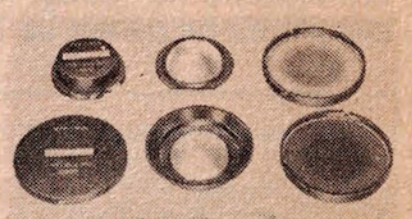
War surplus stereoscope and base with scales for making precise measurements. Now costs less than viewer alone! Ideal for engineers, geologists, and others using vertical aerial photo maps & 3-D drawings, infrared aerial photos for biological studies, etc. Without base: full coverage for prints to 5 x 5". With base (and rotating vernier knurl): operates as height finder; a device for making linear photo measurements. Interpupillary range 55-80mm. Magnification 2.25X. Stereoscope fitted with folding legs adjustable for interocular separation. In 4½ x 7¼" permanent case with screwdriver & instruction.

No. 41,400 $15.50 Ppd.

Aerial photo reproductions of U. S. and outlying areas available from Map Information Office, U. S. Geological Survey, Washington, D. C. 20242. Write them for info.

Surplus Aerial Cameras: Free! Listing of War Surplus Cameras designed for infinity focus required in aerial photography. Models available incl. K-19B, T-5, S-7A, K-20, F-56. All are well color-corrected, in limited supply, sold on first-come, first-served basis. Ask for **Bulletin No. 9882.**

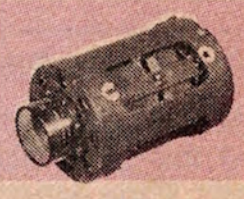
Surplus Aerial Camera Lens



- **Extreme Wide-Angle Metrogon Lens**
- **Original Govt. Cost Over $3,000.00**

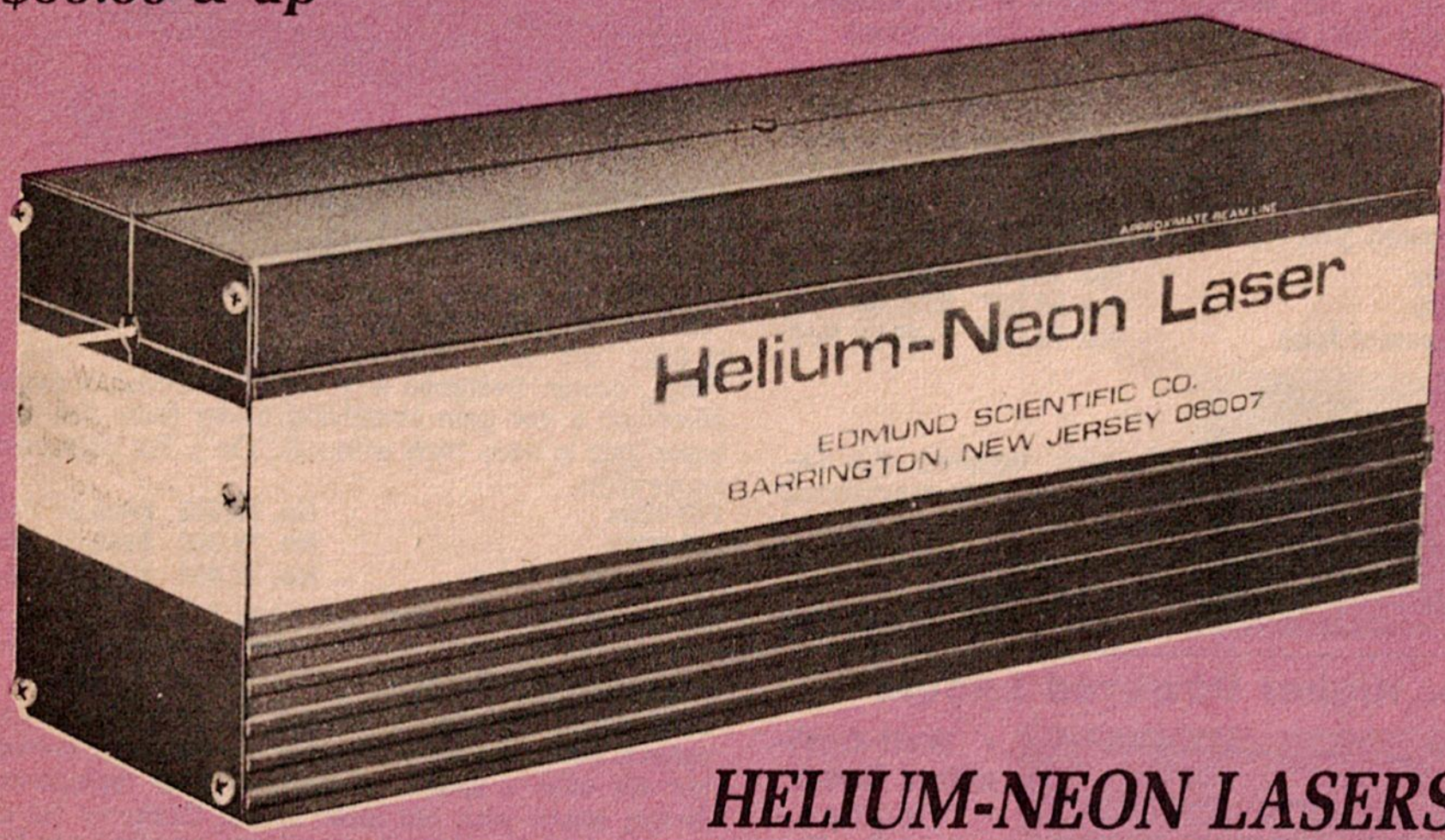
Extremely large coverage (9 x 18" format) makes this high quality lens system ideal for building a Camera Lucida; large photo enlarger; opaque projector; copy lens; very wide angle lens for large format camera. Designed for aircraft cameras (12" F.L., f/6.3 camera lens), mounted elements removed from original lens cone and offered at f/3.5. 2 mounted elements (2 lenses each); yellow vignetting correction filter; red filter; instr. No diaphragm or shutter incl **No. 71,582 $500.00 Ppd.**

Image Rotator



Available Again After 4-yrs. AND At The Same Price. For fantastic movie or TV special effects shots. Whirls or rotates the image slowly through 360°. 3 large prisms with 66mm working aperture rotate fully in ball bearing mount; works like large aperture dove prism. Large 5-element lens at one end of assembly has 70mm clear aperture, no magnification. High quality war surplus. Govt. cost about $1,000. Coated optics. Complete assembly 10½ x 6¼" dia. 26 lb. **No. 85,174 $99.50 T.C.C.**

$99.50 & up



HELIUM-NEON LASERS

- **Top Value**
- **Low Prices**
- **0.3mW & up**
- **Open Cavity**
- **Modulated**
- **TEM_{oo} (single) & Random Modes**

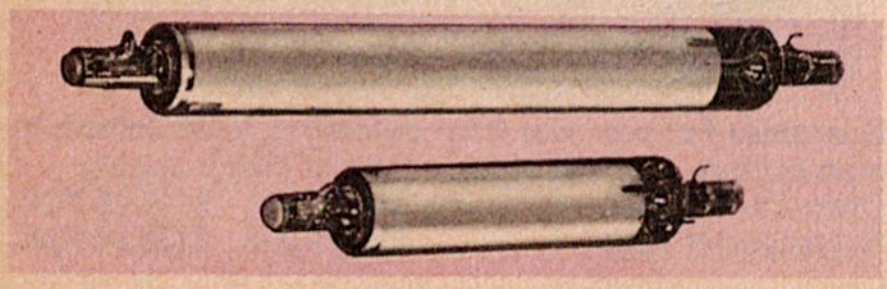
A wonderful new laser line incorporating the latest technology, including the new aluminum cathode tube for greater life, stability and dollar value. For example, a single mode (TEM_{oo}) 0.3mW laser was $129.50 Ppd; now we offer an improved version 0.3mW minimum for only $99.50 Ppd. (No. 79,061) representing industry's most outstanding value for this extremely versatile, highly efficient laser. We've expanded our overall offerings utilizing the new cold aluminum cathode tubes so you can choose from various outputs, modes and types. The perfect model at a price you can afford . . . whether for teaching, research, industry, experimenting, or Science Fair. Each is a self-contained unit with solid state regulated power supply and fitted with mounting holes for use on standard optical bench equipment or tripod. In conjunction with mounting plate No. 41,228, all lasers accommodate the various collimators, spatial filters, and other accessories listed.

Our Complete Line Of HeNe Lasers

Power	Mode	Beam Dia mm	Beam Div. mRad	Voltage	Remarks	Stock No.	Price Ppd.	Repl. Tube	Price Ppd.
0.3mW min.	TEM_{00}	1.2	2.0	110-120	General Purpose	**79,061**	**$ 99.50**	79,063	$ 59.50
0.3mW min.	TEM_{00}	1.2	2.0	220-240	General Purpose	**79,062**	**120.00**	79,063	59.50
1.0mW max.	TEM_{00}	1.2	1.0	110-120	(Low Cost)	**79,064**	**150.00**	79,066	69.50
1.0mW max.	TEM_{00}	1.2	1.0	220-240	(Low Cost)	**79,065**	**165.00**	79,066	69.50
1.0mW min.	TEM_{00}	1.2	1.0	110-120	Initial Lab Laser	**79,050**	**150.00**	79,054	90.00
1.0mW min.	TEM_{00}	1.2	1.0	220-240	Initial Lab Laser	**79,051**	**165.00**	79,054	90.00
1.0mW max.	TEM_{00}	1.2	0.8	110-120	15% Modulated,	**79,026**	**200.00**	79,043	95.00
1.0mW max.	TEM_{00}	1.2	0.8	220-240	15% Modulated	**79,027**	**220.00**	79,043	95.00
0.7mW min.	TEM_{00}	1.5	0.8	110-120	100% Modulated	**79,028**	**400.00**	79,044	195.00
0.7mW min.	TEM_{00}	1.5	0.8	220-240	100% Modulated	**79,029**	**440.00**	79,044	195.00
1.8mW Min.	TEM_{00}	1.0	0.8	110-120	Pro Lab Laser	**79,034**	**200.00**	79,047	140.00
1.8mW min.	TEM_{00}	1.0	0.8	220-240	Pro. Lab Laser	**79,035**	**220.00**	79,047	140.00
3.0mW min.	TEM_{00}	1.0	0.8	110-120	Pro. Lab Laser	**79,052**	**325.00**	79,055	190.00
3.0mW min.	TEM_{00}	1.0	0.8	220-240	Pro. Lab Laser	**79,053**	**358.00**	79,055	190.00
2.0mW min.	TEM_{00}	1.2	0.8	110-120	15% Modulated,	**79,067**	**265.00**	79,069	160.00
2.0mW min.	TEM_{00}	1.2	0.8	220-240	High Power	**79,068**	**292.00**	79,069	160.00
3.0mW min.	Random	1.2	5.0	110-120	Economical High Power	**79,032**	**225.00**	79,046	140.00
3.0mW min.	Random	1.2	5.0	220-240	Economical High Power	**79,033**	**250.00**	79,046	140.00

At the time of printing this catalog, all of our lasers conformed to federal regulations. If new regulations are issued, our catalog will be changed to reflect any differences.

Laser Tubes



Feature a coaxial design for ruggedness and isothermal mounting. The aluminum cathode provides high beam stability and long life under normal operating conditions. Electrical connections to the tube are located within the outside diameter and at the end of the tube opposite the output beam so that ultimate flexibility is available to the user who is incorporating the tubes into his own design. See list above.

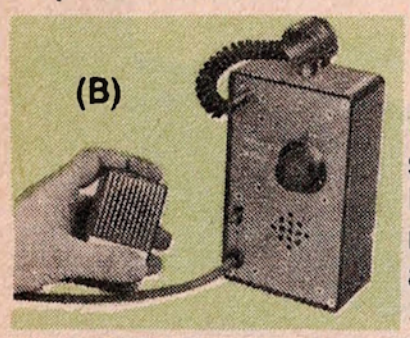
Modulated HeNe Lasers

TALK ON A LASER BEAM

2 Models . . . 15% Modulation (audio & video communication) & 100% Modulation (data communication)

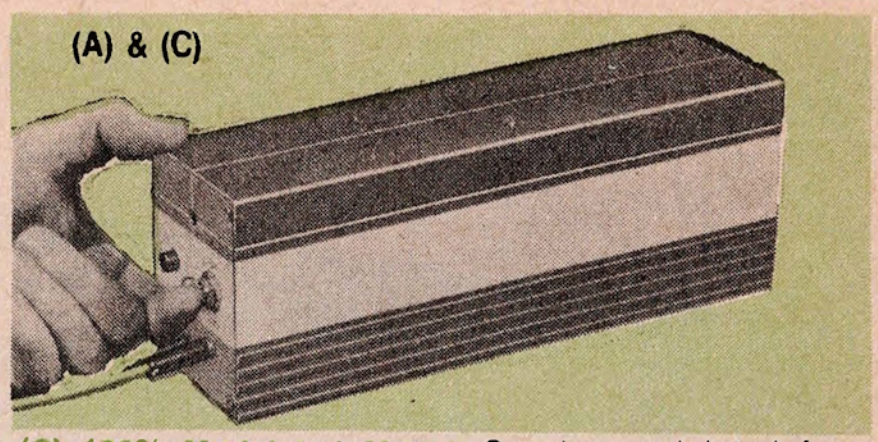
(A) 15% Self-Modulating Model: With no signal this is a well filtered TEM_{oo} Mode 0.8mW, 633nm red neon laser. A built in amplifier, driver, and a 1v signal peak-to-peak provide the full 15% modulated beam. Can be used for video transmission, speed of light meas., and voice transmission (see Kit B). 300-500KHz bandwidth; ran-

110-120v	**No. 79,026**	**$200.00 Ppd.**
220-240v	**No. 79,027**	**$220.00 Ppd.**
Replacement Tube	**No. 79,043**	**$ 95.00 Ppd.**



(B) Voice Receiver Kit: Designed for 15% modulated lasers, the kit has a crystal microphone, photosensor, and ¼ watt speaker.

No. 71,622 $75.00 Ppd.



(C) 100% Modulated Model: Can be modulated from "On" to full "Off" from DC to 160 KHz. "Off" level is-4 to 0.5v; "On" is +2.5 to +5.0v. Emits approx. 1mW of TEM_{oo} power. Designed with high transmission output mirror on a low gain amplifying cavity (tube has adequate gain to have 1mW with full "On"). For data communication.

110-120v	**No. 79,028**	**$400.00 Ppd.**
220-240v	**No. 79,029**	**$440.00 Ppd.**
Replacement Tube	**No. 79,044**	**$195.00 Ppd.**

Talk on an FM radio wave, see page 117.

New Higher Powered Lasers

- **Well-Collimated Beam**
- **Professional Quality**

Our Best Starter Lab Laser . . . 1.0mW TEM_{00} Mode

High power plus precision beam collimation make this an excellent choice for most optical bench experiments. Power supply is a regulated current control with a solid state feedback system.

110-120v	**No. 79,050**	**$150.00 Ppd.**
220-240v	**No. 79,051**	**$165.00 Ppd.**
Replacement Tube	**No. 79,054**	**$ 90.00 Ppd.**

High Powered Professional Lab Lasers

- **Holographic Viewing**
- **Diffraction Pattern Demonstrations**

A longer coherence length tube, combined with higher powers useful in interferometric and diffraction patterns, make these the perfect lasers for large group demonstrations. A necessity where optical alignments must be done in broad daylight over long distances. Tight current regulation; instant "on"; steady output.

1.8mW min. TEM_{00}, 110v	**No. 79,034**	**$200.00 Ppd.**
3.0mW min. TEM_{00}, 110v	**No. 79,052**	**$325.00 Ppd.**

Replacement Procedure For Older Lasers

Tubes listed on page 151 will not fit lasers offered up to catalog #731. The old style tubes are no longer available but we offer a special arrangement for replacement. Simply return your old laser to our Customer Service Dept. and for the price of a new Aluminum Cathode Tube and small modification charge, we will supply you with a completely new laser with full 18-mo. guar.

Old Laser	Replacement Cost
Nos. 79,004 and 79,005	**$74.50 Ppd.**
Nos. 79,008 and 79,009	**$85.00 Ppd.**
Nos. 79,006 and 79,007	**$130.00 Ppd.**
No. 79,015	**$155.00 Ppd.**
No. 79,018	**$115.00 Ppd.**

Heavy Duty Laser Tripod

A sturdy tripod with many versatile features for all your laser needs. Excellent for outdoor work regardless of the surface. Features: friction drag, cross-braced legs, adjustable feet with flip down points for soft surfaces, tilting and rotating head, non-slip securing lock and screw head. Folds; extends 32-67". Wt. 6 lb.

No. 80,174 $95.00 Ppd.

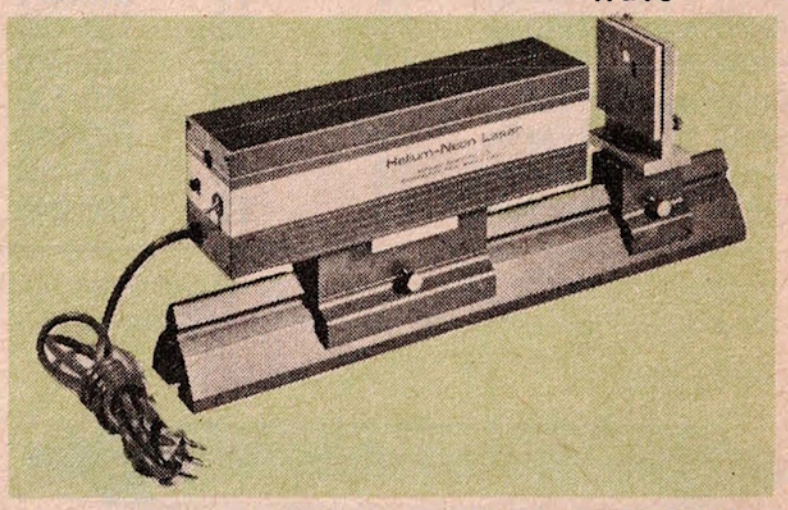
Guarantee. Complete Lasers against failure due to materials and workmanship for 18 months from invoice date when operated normally. (No. 85,901 12 mos.). Replacement tubes 90 days against failure due to materials and workmanship.

Deluxe Open Cavity Helium Neon Gas Laser

- **Gimbaled Mirror**
- **Multi-Mode**
- **Continuous Wave**

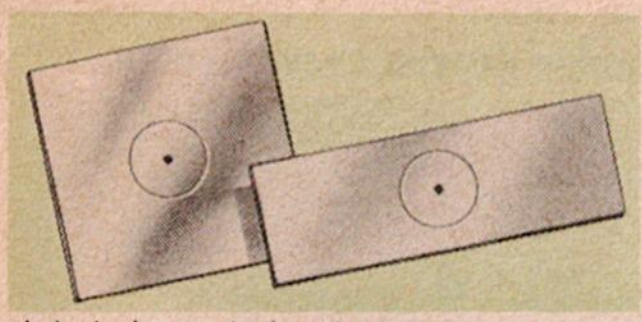
Perfect for intracavity modulation experiments, measurements and analysis of optical window surfaces, multi-mode experiments and demonstrations, Raman spectroscopy, and a variety of other applications that only open access to optical cavity will allow. Produces a continuous beam of coherent, monochromatic light. (Beam dia. 1.0mm; divergence: 0.8 milliradians). A Brewster window polarizes the beam (1.5mm dia. in TEM_{oo} Mode) directed across a 3" open cavity to direct an external mirror mounted on gimbals, 6328A.

Laser and gimbaled mirror are mounted on 19" long, aluminum, triangular base for maximum stability and mirror position accuracy. Provides ripple-free laser light. Output: 1.0 milliwatt min. (TEM_{oo}); 3 milliwatts typical (multi-mode). 8 x 19 x 3" overall; input 105-125v AC, 60-cycle, 20 watts; output approx. 2,400v at 5ma DC. On-off switch automatic built-in "kicker" supplies 5,000v pulse. 14 lb. shipping wt.



Guarantee-For one year from delivery against defects in manufacture, burnout of laser tube or power supply.

Open Cavity Laser	**No. 85,901**	**$349.50 TCC**
Replacement Tube	**No. 79,013**	**$139.50 Ppd.**



Precision Pinholes

Use to control apertures of light beams, laser beams, as spacial filters, etc. Each pinhole is made in blackened, metal foil, mounted in a .625" dia. metal disc. which fits the metal mounts listed below.

Individual Precision Pinholes

1 micron (±0.5μ)	**No. 30,604**	**$29.50 Ppd.**
10 micron (±1.0μ)	**No. 30,605**	**$15.75 Ppd.**
25 micron (±1.0μ)	**No. 30,606**	**$15.75 Ppd.**

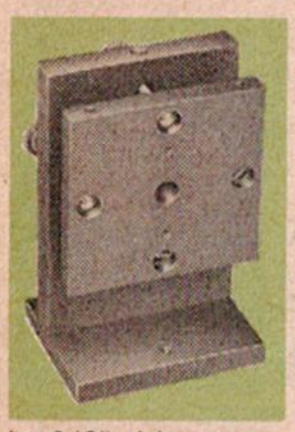
Sets of 4 pinholes. Each set contains 1 pinhole each per specific range. Sorry, no selection within ranges. Sizes marked on package. Accuracy: 1-24 microns, ± 0.5μ; 25 microns and up, ± 2%. Imported from England.
Set A. 1 each, in the following micron ranges: 2-5; 6-9; 12-18; and 19-24. **No. 41,480 $57.50 Ppd.**
Set B. 1 each, in the following micron ranges: 25-40; 41-75; 76-120; & 121-200. **No. 41,481 $47.50 Ppd.**
Metal Mounts for Pinholes. Convert pinholes listed above to 2 x 2" and 1 x 3". Mounts, .075" thick, have center holes tooled to accept the .625" dia. pinhole metal discs.

2 x 2" Metal Mount.	**No. 30,607**	**$4.00 Ppd.**
1 x 3" Metal Mount	**No. 30,608**	**$4.00 Ppd.**

WARNING!
If improperly viewed, low output lasers can cause eye damage. Looking directly into the beam or into a bright reflection can be as harmful as gazing into the sun. Please exercise caution! Shield your eyes when using lasers!

Laser Safety Goggles

Protect your eyes and those of your students or employees. Goggles intended for use with He-Ne lasers at 6328Å They attenuate the frequency by a factor of over 1,000 without seriously impairing visibility. Comply with Radiation Safety Act of 1968. Comfortable vinyl frame; blue-green plastic lens; 6 air vents; adjustable headband. **No. 60,854 $20.00 Ppd.**

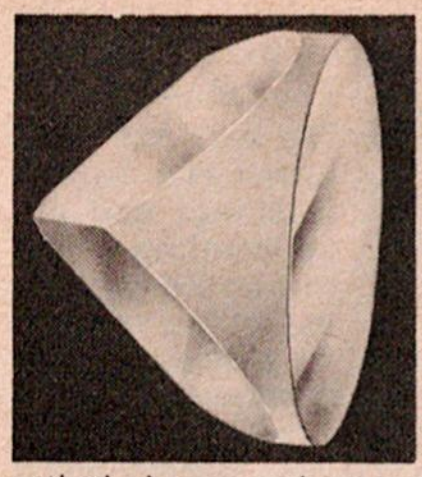


Uni-Pivot Gimbal Mount

Unique single ball pivot keeps adj. problems to a minimum! Support optics and other devices requiring fine angular adj. Range: ±15° about 2 perpendicular axes in vertical plane w/30 sec. of angle resolution. Pivot ball has ½" hole, allowing light beams under ¼" dia. to pass through any secured transparent optics. Has #6-32 tapped holes. 3/8" central hole in 3/8" thk. mounting plate can be reworked to 1". Anodized alum. Overall: 5 x 2-3/8 x 3". Center of Gimbal aperture approx. 3-9/64" above bottom of base plate. Wt. 1 lb. 7 oz. **No. 60,816 $60.00 Ppd.**

Brewster Window

Specially selected fused quartz not absorbed in near ultra-violet (up to 200 Nanometers). Window is highly parallel and highly polished on both sides. Gives very low loss transmission at 6328Å when mounted on a laser tube at Brewster's angle. 11mm dia. x 1-½mm thk. Pre-tested in a laser cavity. Flat to 1/100th wave over the dia. of a laser beam. Good for Helium-Neon, Helium Cadmium, and Argon Lasers. **No. 30,684 $12.25 Ppd.**



Corner Cube Reflector Trihedral Prisms At Terrific Savings $$$

Why pay 3 times more? Same type sent to Moon to return laser beams. These quality trihedral prisms reflect light entering prism entrance face and return the light to the source. Use as moving retroreflectors; in laser work, lab experiments; optical shops; and research work. All with knife-edge roof. Material: Bk-7. Flatness to 1/10 wave. Imported.
1" Corner Cube. Ray deviation: 16-25 arc seconds. **No. 41,378 $50.00 Ppd.**

2½" Corner Cube. Ray deviation: 1-5 arc seconds. **No. 41,399 $226.50 Ppd.**

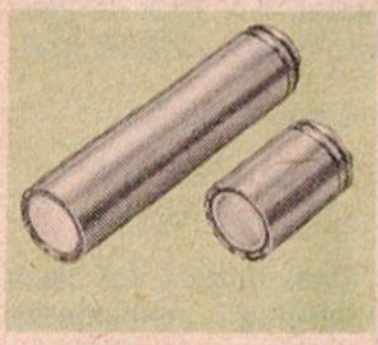
Other sizes and ray deviations are available in ½" increments from ½ to 2½" with ray deviations of: 1-5; 6-10, 11-16, 17-25, and 26-45 arc seconds.

2¾" Corner Cube Prism Rejects . . . $50.00! A real surplus bargain . . . in some research applications the imperfections in these prisms should not interfere! Slight flaws (i.e. minor scratch or chip) will not interfere with their function. Made in U.S.A. **No. 41,750 $50.00 Ppd.**

Photometer . . . a photocell driven microammeter

- **For Quantitative Work**
- **8 ranges; read directly in mw**

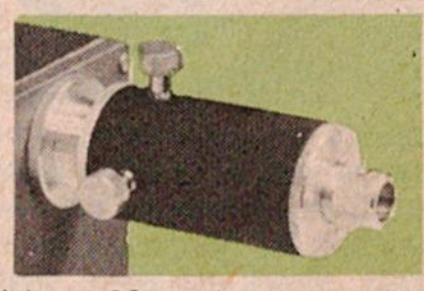
General purpose accessory multimeter with battery-operated, solid state amplifier for extra sensitivity: 1 microamp DC full scale on most sensitive scale. A useful laboratory amplifier and ideally suited for holographic measurements. Output plugs provide 5v DC for full scale reading. Frequency response of amplifier extends from DC to between 1 KHz and 50 KHz, depending upon sensitivity. Has 1cm sq. silicon photocell mounted in a 25mm cylinder with phone jack. incl. calibration curve. Spectral response of cell extends from below 500mm to over 1 micron. Useful range: 0.3 micro watts/cm² to 0.3 watts/cm² when pinhole cover is used. 2 x 3¾ x 6". Instr. and calibration curves incl.
Requires two 9V transistor batteries.
No. 71,550 $70.00 Ppd.



8X & 20X Collimators

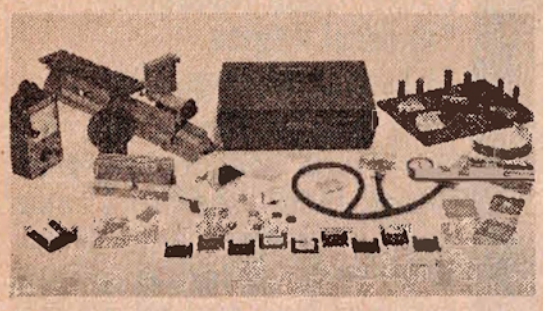
Focusing Gallilean telescopes (require Mounting Plate, No. 41,228, pg. 154) that increase a laser beam's dia. by 8X or 20X. For use at longer distance with less beam divergence. For Edmund lasers.
8X No. 41,669 $40.00 Ppd.
20X No. 60,903 $50.00 Ppd.

Spatial Filter Assembly For A Clean Beam



Provides a clean, noisefree laser beam for holography and wherever a clean beam is desired. Filter eliminates interference fringes and off-axis modes. Beam is focused by a 36mm lens, through a 25 micron pinhole. Emerging beam is divergent; may be recoverged by a positive lens. For use with TEMoo mode lasers only. Overall size: 4½ x 1½" dia. Instr. incl. (Requires Mounting Plate, No. 41,228, pg. 154).
No. 41,668 $65.00 Ppd.

"Revolution in Optics" by S. Tolansky "Electro-Optical technology", laser optics & holography, etc. Pprbk, 22 pp. 4-3/8 x 7¼". **No 9106 $1.45 Ppd.**



Deluxe Optics Education Kit

The laser has revolutionized optics teachings and experimenting. With the equipment in this kit you progress from beginning concepts of light, to geometric optics (beams), and through physical optics (waves).

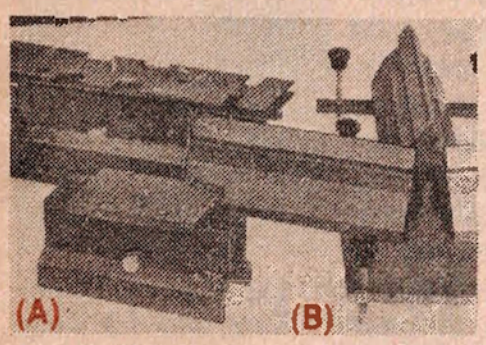
Lab. manual (8½ x 11") includes description theory, and over 20 exercises. Kit also includes: ½-meter optics bench; photometer; rotary compass panel; laser (carrier), gimbaled mount; polarizing plates; mounted lenses; filter set; triancular and plano-cylindrical prism; mounted glass plates; diffraction gratings; calibrated periodic scale; slit and grating slides; hologram; front surface mirrows and neutral density filter. Laser not incl. **No. 71,822 $250.00 Ppd.**

Laser Optics Exercise Kit . . . Great For Schools

The safety and simplicity of Laser experiments makes student involvement easy and interesting. Perform a variety of laser optics excercises (from light intensitty and scattering to diffraction and holography). Manual contains theory behind laser operation and ten illustrated exercises. Kit contains: polarizing plates; mounted lenses; filter set; triangular prisms; rotary compass scale; diffraction grating; slit and grating slides; hologram; beam splitter; front surface mirrors; air-film wedge.

No. 71,823 $95.00 Ppd.

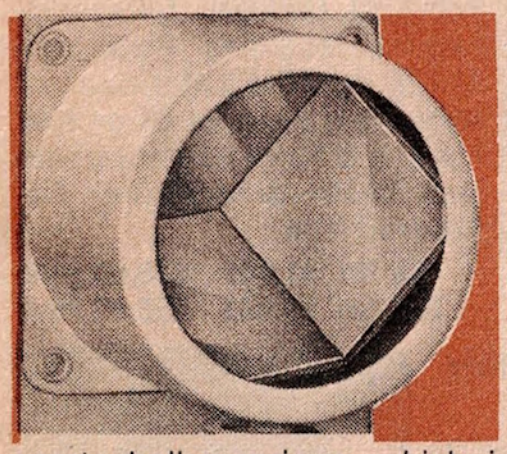
Laser Carrier & Base For Bench Mounting Ease



(A) Adjustable Laser Carrier—Designed to mount lasers to triangular optics benches at the appropriate modular height above the bench. Since it is also adjustable, the laser may be moved up, down, sideways, and rotated about a vertical axis. Fine screw adjustments are provided for rotating the laser about a horizontal axis. Overall size: 2¾ x 3 x 11½".

No. 71,552 $22.75 Ppd.

(B) Universal Connecting Base—Make linear or angular arrangements for 2 or more optical benches. Very useful in equipment setup for interferometry, holography, and other work in laser optics. Metal; 6 x 10 x ¼" thk. Incl. 4 adj. screws and T-nuts. **No. 71,551 $18.00 Ppd.**



Low Cost, High Quality Corner Mirror

Ideal targets for laser ranging instruments, distance metrology, interferometry, lab testing, etc. Extremely lightweight, rugged reflectors that incorporate hollow prisms, which increase the measuring range over solid glass prisms of the same aperture and accuracy. They operate over a wide temp. range without waiting for normalization time. 1 arc seconds of accuracy; shock mounted; sealed in alum. housing; drilled for mounting; size 2½"; range: ½-mi. Wt. ½ lb.

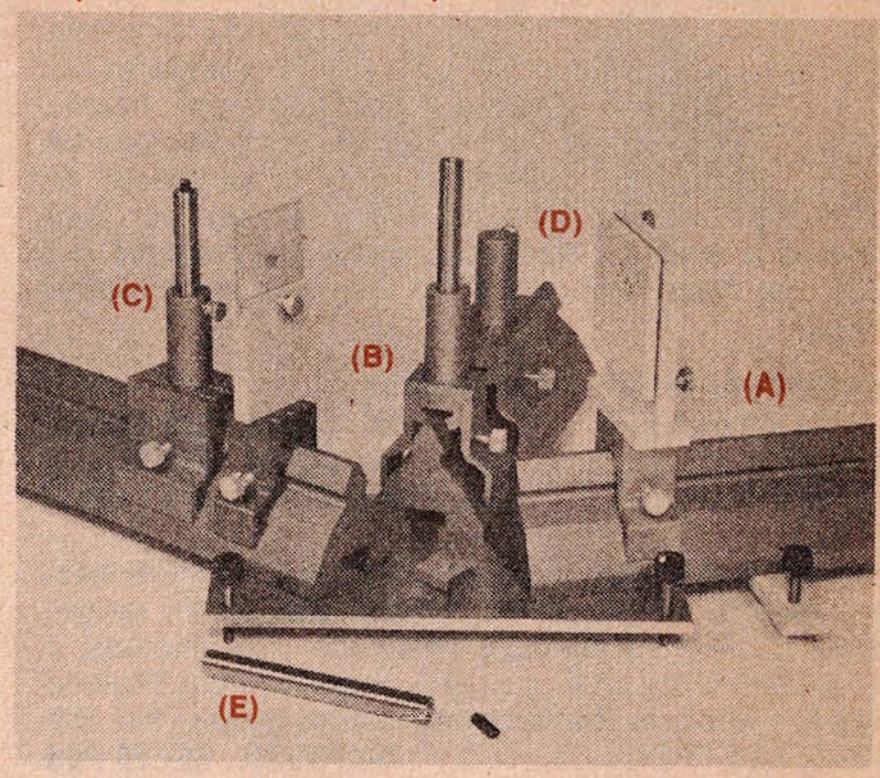
No. 71,692 $86.50 Ppd.

Super Low-Cost Corner Mirror. As above but 1 minute of arc accuracy. For applications where 71,642's 1 arc second accuracy is not required.

No. 71,863 $57.50 Ppd.

Mirror For Infra-Red Light—same as above but without cover glass; can be used for infra-red as well as visible light. **No. 71,693 $86.00 Ppd.**

Helpful Accessories Expand Laser's Value



(A) 1 Meter Optics Bench . . . For mounting accessories, optical systems, etc. **No. 80,129 $31.95 Ppd.**

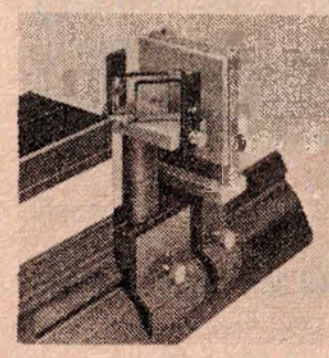
Pin Carriers fit above optics bench and hold accessory pins.
(B) 30mm Carrier **No. 60,823 $10.50 Ppd.**
(C) 60mm Carrier **No. 60,796 $10.50 Ppd.**
(D) 90mm Carrier **No. 60,824 $10.50 Ppd.**

(E) Mounting Pin . . . Fits on pin carrier and holds accessories. **No. 41,229 $5.50 Ppd.**

Laser Carrier fits above optics bench and permits 360° rotation. **No. 60,822 $10.50 Ppd.**

Diverging Lens . . . 8.5mm dia., 8.6mm F.L.; diverges beam for viewing holograms. Fits into mounting plate (below). **No. 41,231 $5.50 Ppd.**

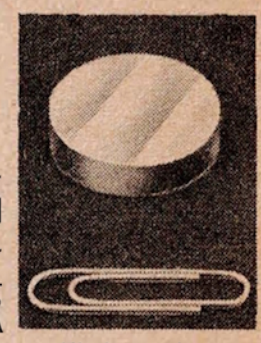
Mounting Plate attaches to front of laser. Holds lenses, spatial filters, collimator telescopes, and other accessories. **No. 41,228 $10.95 Ppd.**



Fine Michelson & Fabry-Perot Interferometer

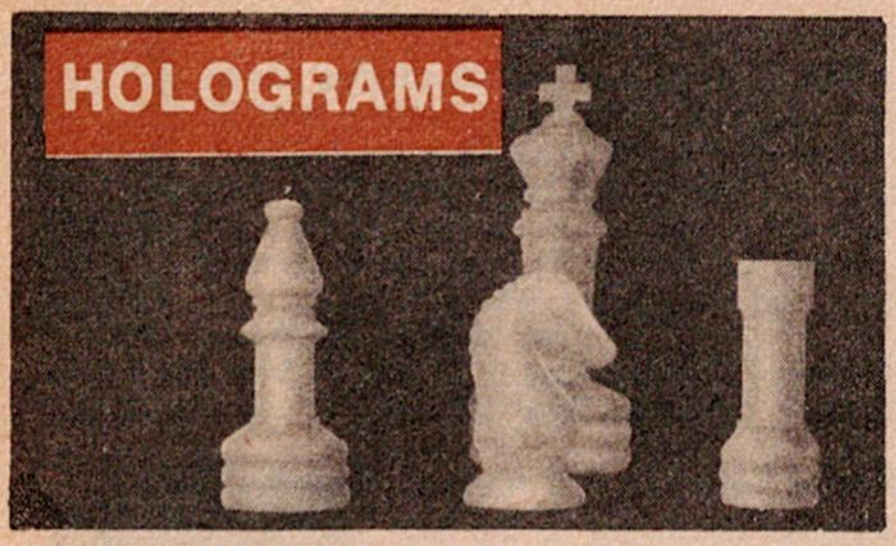
Useful instructive addition to Optics Education Kits. Mirrors, beam splitter, holders, gimbal, etc. Produce & observe sharp circular fringes when mirrors are parallel. **No. 71,334 $51.50 Ppd.**

1" Dia. Super Reflections . . . Low Scatter Super-Smooth Mirrors



A by-product of space optics technology, these super-polished nickel plated aluminum optical flats have a state-of-the-art super-smooth finish. Their residual micro-roughness is about 10 Å r.m.s. from the mean surface; scatter coefficient is reported to be two order of magnitude less than the equivalent standard polished metal reflector. Approx. reflectance is 90% at 10.6μ, 50% at 0.5μ. Exceptional properties for laser systems, telescopes, and optical systems where the image of a weak source is being overwhelmed by surface scatter radiation. Includes cleaning instr. and reprint from "Optical Spectra" by Gerald Marshall clearly explaining super-reflectors and describing simple test arrangements to demonstrate their supersmooth qualities. **No. 1937 $79.50 Ppd.**

Optical Slits see Pages 9 & 156
Beam Splitters see Page 141
Other Accessories throughout catalog



Available Again! Now in Stock!

Holograms are true 3-D pictures taken by splitting a laser beam into two parts. One part is reflected from a mirror onto a high-resolution, photographic recording plate; the other is reflected from the subject onto the plate. Interference between the wavefronts of the two creates an image which shows incredible characteristics. When the recorded image is reconstructed, the subject is suspended in mid-air beyond or in front of the hologram and appears in true 3-D perspective. You can look around, over the top and under the subject and see all the details! The entire scene is recorded everywhere on the plate, while at no spot exclusively. Cut off a few areas of the plate, each piece will still contain the full scene. This can be done repeatedly.

Holograms may someday lead to 3-D T.V. and motion pictures.

Very Easy To See And Demonstrate

Reconstruct these holograms with light from a laser, 35mm projector, or high-intensity desk lamp and our included monochromatic filter. (Note: Reflection holograms do not require a filter and can even be viewed with a penlight.) When you look through the hologram the image appears in 3-D against a dark background. Change your angle of view by moving your head and the image also changes its perspective against the background. Instr. incl. for building viewing box and using 35mm projector as light source.

3 Types Available . . . ⅓ Off Past Prices

Transmission Type (pictured) produces chessmen scene beyond the hologram.

Projected Image Type. Dinosaur scene is projected in front of the hologram.

Double Scene Type. 2 scenes; dinosaurs and geometric shapes recorded on same film. View them separately by rotating hologram 180°.

Type	Approx. size	Stock No.	Price Ppd.
Transmission-film	2½ x 4"	**41,090**	**$ 3.00**
Transmission-film	4 x 5"	**40,969**	**7.50**
Proj. Image-film	2½ x 4"	**41,092**	**5.00**
Proj. Image-film	4 x 5"	**41,095**	**10.00**
Dbl. Scene-film	2½ x 4"	**41,091**	**5.00**
Dbl. Scene-film	4 x 5"	**41,094**	**10.00**

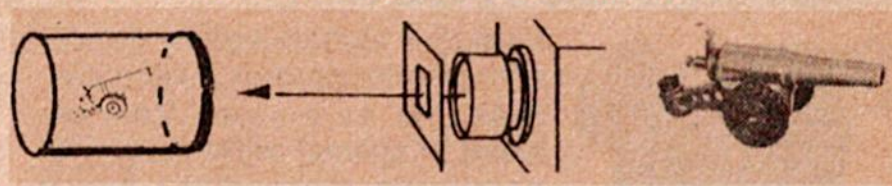
Precision Mirrors For Making Holograms

Aluminized optical flats with guaranteed accuracies of .000005" (1/5 wave) and .000002" (1/10 wave) or better. Also use in telescopes, siderostats, coelostats, etc. Individually cased. Instr. incl.

Dia.	Thick.±	Wave	Stock No.	Price, Ppd.
2"	1/2"	1/10	**1920**	**$42.00**
3	5/8	1/10	**1921**	**66.00**
3	5/8	1/5	**1924**	**42.00**

Don't miss fantastic new holograms and complete viewing system on page 8.

Now . . . An Amazing 360° Hologram



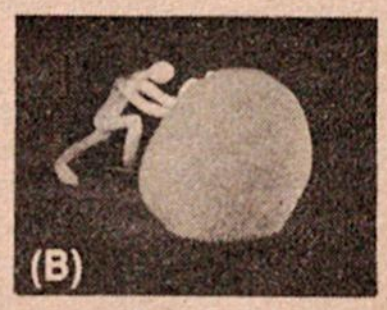
Rotates 360° so you can see all sides of a cannon, just as if it were there. Turn it left, see left side; turn it right, see right side. All in realistic 3-D. Seems to float in air. **No. 71,101 $20.00 Ppd.**

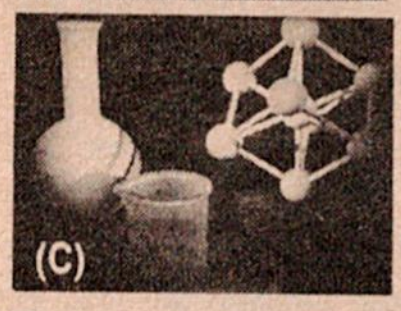
3-in-1 Hologram

Shows An I-Beam in 3 Conditions of Stress—Holography in study of stress analysis. 4 x 5" hologram displays 3 different images: 1 of an I-beam under no stress; under slight stress; and under extreme stress.

No. 41,362 $15.00 Ppd.

New Holograms . . . Reflection & Transmission





Reflection Holograms can be viewed with projectors, desk lamps, or a penlight held about 10" away. Scene is reflected beyond hologram.

(A) Marching Band. 3-7/8 x 4-7/8" **No. 41,868 $5.75 Ppd.**

(B) Man With Rock. 3¾ x 4¾" **No. 41,870 $5.75 Ppd.**

(C) Transmission Hologram on film with monochromatic filter incl. Produces a Molecular Model and Beaker. 3-1/8 x 4-1/8" **No. 41,871 $4.50 Ppd.**

Holographic Film And Chemical Kit

Intrigued by 3-D pictures? With your laser, holographic equipment, and this kit you can make your own holograms. Designed for beginners; has sufficient materials to make 50 holograms! Incl. fixer; print developer; stop bath with indicator; 50 sheets of film (7.5 x 7.5cm); instr. **No. 71,335 $25.00 Ppd.**

Beam Splitter For Holography

To make a hologram, place beam splitter in front of laser to split beam into 3 parts . . . so one passes through and onto target (subject of hologram), while 2 others come off at right angles. This beam splitter (1 x 1½ x ¼") is a small piece of highly polished optical glass with exactly parallel surfaces.

No. 41,264 $5.50 Ppd.

"Holography" By H. Arthur Klein

Clearly explains holography . . . it's tools, tricks, possible uses & future. Illus.; 6-1/8 x 8¼"; 192pp; hrdbk.

No. 9450 $5.95 Ppd.

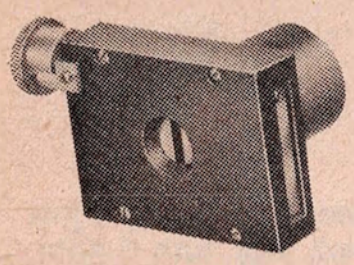
"Lasers And Holography . . . An Introduction To Coherent Optics" By Dr. W. E. Knock; a careful review of underlying wave concepts, including coherence, diffraction, and interference. Illus.; 4 x 7"; 103 pp; pprbk. **No. 9408 $1.45 Ppd.**

"ABC's of Lasers and Masers" Allan Lytel

The first easy-to-understand coverage of one of the most amazing developments of our time.

No. 9367 $3.50 Ppd.

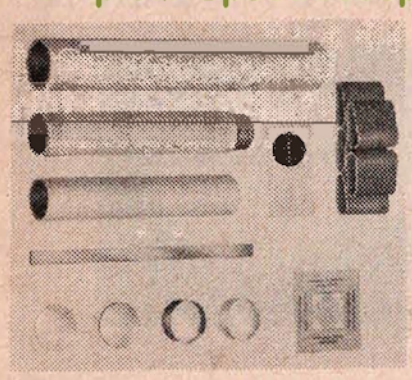
Precision Adjustable Optical Slit



Here is a highest-quality optical slit of micrometer precision, available as a stock item instead of special order only. This precision instrument has a basic use in high-level spectroscopy or wherever an extremely accurate adjustable slit is required. Both jaws stay completely parallel and open equally from the center, maintaining the same optical axis at all adjustments. Slit is brass and stainless steel, and black coated, overall length 40.8mm, width 51mm, height 38mm, tube dia. 23.9mm, O.D. and tube length 28mm. Jaws have 0 through 6mm usable opening.

No. 40,488 $112.00 Ppd.

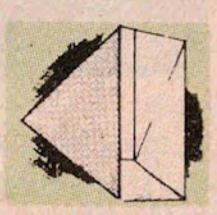
Complete Spectroscope Kit . . . Only $8.50



Here is everything you need to make a fine, working spectroscope, including easy-to-follow directions that make the doing simple. Kit consists of 2 achromatic objective lenses; a plano-convex lens; a 2 x 2" replica grating slide; film reticle and slit; a 5/16 x 7" aluminum bar; 5 rubber bands; and tubing—1 piece 1¼" O.D., 7½" long which is cut in half and 2 pieces 5" with 1" O.D. from which telescope and collimator tubes are made.

No. 50,237 $11.00 Ppd.

60-Degree Spectroscope Prism



Polished surfaces flat to ½ wave. Angles accurate to 5 minutes of arc. Polished surface dimensions 1 x 1-3/16". Made from dense flint glass, free of striae and strain. Index of refraction 1.648. Use with all spectroscopes. 60-degree angle gives greatest dispersion of spectrum consistent with least loss of light. Use to make spectroscope.

No. 30,143 $13.95 Ppd.

Complete Prism Listings. Pages 143. 144

Constant Deviation (Pellin-Broca) Prism

Use for precision, easily calibrated spectroscope—wavelengths correlate directly with angle of rotation. No need to change position of slit, collimator or telescope tube . . . just rotate prism. Entrance and exit faces approx. 1".

No. 30,342 $27.50 Ppd.

"Make Spectroscopes & Spectrographs". Diagrams show spacing of components. Explain spectrum, prism and grating spectra, Fraunhofer lines, etc. 12 p., 8½ x 11".

No. 9052 50¢ Ppd.

Cutting's "Manual of Spectroscopy." History, theory, light sources, uses, characteristic lines of elements, wave length table, etc. Hardbound, 220 p., 5¾ x 8¾".

No. 9283 $7.50 Ppd.

Glass Neutral Density Filters—1" Square

Excellent for use as light alternators. Spectrally flat from 375.0nm-2,000.0nm. Variation from flatness will not exceed ± 10.0% from 375.0nm-500.0nm and ± 5.0% from 500.0nm to 2,000.0nm.

Stock No.	Density	% Trans.	Price
30,720	0.3	50	$8.50
30,721	1.0	10	8.50
30,722	2.0	1.0	9.75
30,723	3.0	0.1	9.75

Black Light, see pages 110-111. Growing Lamps, see pages 44-48. Illuminated Magnifiers, see pages 30-31. Lasers, see pages 151-154. Microscope Illuminators, see page 87 Optical Flat Lamp see page 142

Concentrated Tungsten Arc Lamp

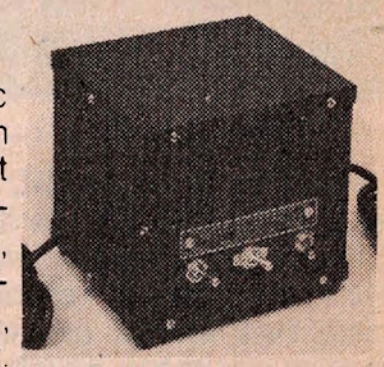
2-Watt. High brilliance (6000 candles per sq. in.), very small size. Voltage across lamp 27. DC current through lamp .09 amps. 0.32 C.P., rated life 150 hr. .007" light source dia. Type A2T. Fits miniature 3-pin socket. Burns in any position. Light projects from end of lamp. 2" long, incl. prongs, dia. 5/8". Instr.

No. 30,360 $21.70 Ppd.

10-Watt. Zirconium Type C10. **No. 41,548 $30.80 Ppd.**

25-Watt. Zirconium Type C25 **No. 41,549 $35.00 Ppd.**

Power Supplies For Above



Matched electrically to the Arc Lamps above and used with these to obtain a brilliant point source light. Good for demonstrating optical phenomena, testing lenses, illuminating optical instruments, etc. 115v AC, 50-60 Hz. 6-ft. input and 6-ft. output cord. **2-Watt.** (illus.) Power switch, starter switch. 6 x 6 x 6".

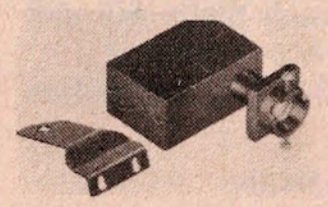
No. 70,181 $47.50 Ppd.

10-Watt. On/off switch. 5½ x 9½ x 10".

No. 71,449 $129.50 Ppd.

25-Watt. (Same as 10w). **No. 71,450 $139.50 Ppd.**

Miniature Spotlight



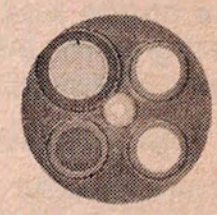
New surplus unit has 3v, screw-base flashlight lamp and extensions holding a lens. Hooked up to any 3v source, unit projects 3/8" dia. spot of light from a distance of 2¼". 1-9/16 x 1-5/16 x 9/16". Instr.

No. 41,134 $3.00 Ppd.

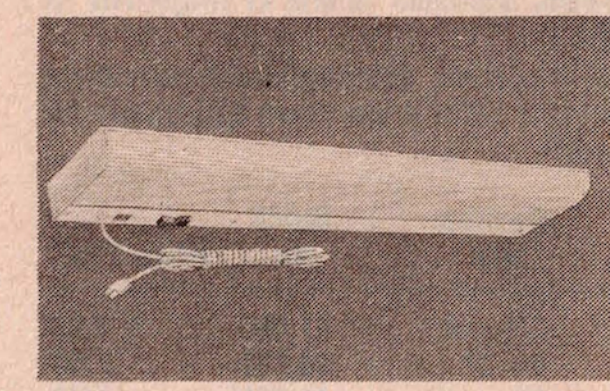
2.7v Flashlight Lamps . . . Only 2½¢ Each For projects using small (1¼" overall) lamps with 0.36" dia. flanged bases. (Brand new, but bases need cleaning.) GE or Westinghouse type Pr-9. Pkg. of 100.

No. P-60,346 $2.50 Ppd.

Surplus Filter Wheel. Brass wheel, 5-7/8" dia., 1/8" thick, 3/8" dia. center hole. Three 35mm clear aperture filters (red type A, dark yellow, clear) and 1 variable-density polarizing filter (40.5 mm clear aperture).



No. 60,145 $4.00 Ppd.



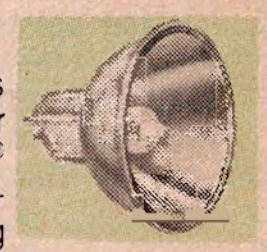
Compact Fluorescent Light Unit

Gives maximum light; requires minimum space. Most for your money; plain, slim, flat, fits under shelves, counters, cabinets, display cases. Has ridged-plastic diffuser; white, enameled metal case; mounting holes; screws; cord; plug; outlet; 18" 15w, fluorescent tube. Use 110v AC. Imported.

No. 70,945 $9.95 Ppd.

Black light tube for above. **No. 60,126 $6.95 Ppd.**

New 120v Halogen Lamps



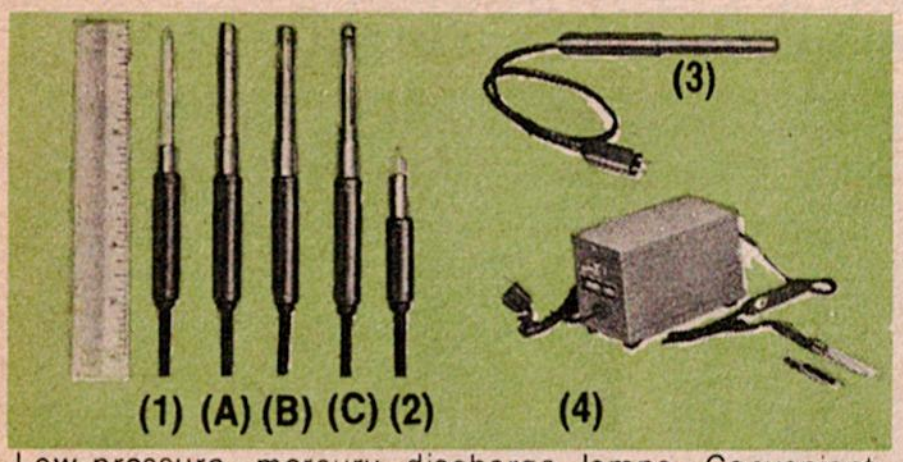
ELH Type. 300w lamp almost equals 500w in output! Exact replacement for new Kodak "H" series Carousel® projectors. Self-cleaning halogen cycles, won't darken. Heat resisting socket; 1¾" dia. reflector built-on. Requires fan cooling. 35 hr. life.

No. 41,707 $12.50 Ppd.

ENH Type. Extends life to 175 hr. but less bright. Use with any Kodak projector with "H" suffix (860H, 760H, etc.)

No. 41,724 $15.50 Ppd.

Compact UV Lamps . . . With Accessories



Low-pressure, mercury discharge lamps. Convenient, intense, UV sources for various uses: calibration of spectrophotometers, inspection, etc. Long (3360Å) & short (2537Å) wave types; all with 15" cord and plug for power supply (below), which provides the necessary 800v starting and 220v operating voltages.

Quartz Pencil Lamps (Short Wave). Intensity 42 uw/Cm² of 2537Å light at 12" (420 uw at 1"). Each approx. 2 oz.

Lamp 1: 2-1/8 x ¼" O.D. Overall 5" long, incl. ½" dia. handle. Choice of shield A, B, or C. **Each $39.50 Ppd.**

A. (1mm dia. ap.): point emission. **No. 40,758**

B. (5/16 x 5/8" ap.): interferometry. **No. 40,759**

C. (3/16 x 1½" ap.): spectrophotometry. **No. 40,760**

Lamp 2: ½ x ¼" O.D. Overall 3" long, incl. ½" dia. handle. No shield required. **No. 40,757 $39.50 Ppd.**

3. Black-Light Lamp (Long Wave). Has filter that minimizes visible light. **No. 40,765 $54.50 Ppd.**

4. Power Supply. 5½ x 2¼ x 3½", 2-ft. secondary cord, and 8-ft. primary cord; 115v, 50/60 cy. 0.22 amps. Wt. 4 lb. **No. 70,298 $32.50 Ppd.**

Lamp 1 Filter Shield absorbs visible, transmits short-wave. ¼ x 1-3/8" aperture. **No. 40,764 $10.00 Ppd.**

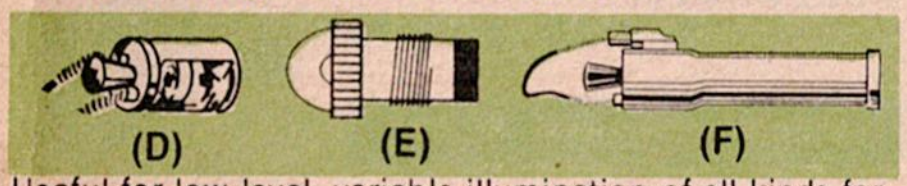
Monochromatic Glass Filters for Quartz Pencil Lamps. 2 ea. of 5461Å (green) or 4358Å (blue) line. **$30.00 Ppd.**
Green line set: No. 40,766 Blue line set: **No. 40,767**

World's Smallest Lamps

Slightly out of military specs, but fully suitable for experimenters or hobbyists. All have pigtail leads.

Lamp	(A)	(B)	(C)
Volts	1.5	1.5	5
Current, milliamperes	15	30	55-120
Diameter, Inches	.016	.030	.124
Length, Inches	.070	.080	.250
Light Output, millilumens	60	160	300-1800
Life Expectancy, Hours	800	1,000	4,000-16,000
Lead Material	platinum	platinum	copper
Stock No.	**40,689**	**40,690**	**40,691**
Price, Ppd.	**$6.00**	**$6.00**	**$2.10**

Grain of Wheat Bulb and Accessories



Useful for low-level, variable illumination of all kinds for instruments, reticles, models.

(A) BULB, screw base, 3/16" dia. x ½" long, 1½-3 volts. **No. 40,188 75¢ Ppd.**

(B) SOCKET for No. 40,188. Brass, screw-in type with 30" long shielded wire lead. **No. 40,629 75¢ Ppd.**

(C) REFLECTOR AND SOCKET, ½" deep, 1-9/16" dia. bright reflecting metal surface. **No. 40,274 50¢ Ppd.**

(D) SWITCH WITH RHEOSTAT, for No. 40,188. Two circuits. 1-5/8" dia. x 2-3/8" long. **No. 60,345 $1.25 Ppd.**

(E) 3V AMBER BULBS. No sockets needed. Solder leads to 11/16 x 3/8" dia. brass base. Instr. Pkg. of 3. **No. P-41,083 $1.00 Ppd.**

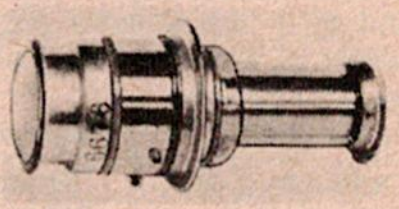
(F) BATTERY HOLDER with switch, rheostat, 10" lead (No. 40,188) bulb, bulb holder. 2 flashlight batteries (not incl.). 2¼ x 7-5/8". **No. 50,095 $2.50 Ppd.**

(G) BULBS. Solder leads to ½ x 3/8" dia. brass screw base. 3v; clear bulb. Pkg. of 3. **No. P-41,402 $1.00 Ppd.**

IR Image Conversion Tube

New IP25A infrared image tubes convert invisible infrared rays to visible image. 4¼" long x 1-5/8" dia. Each tested before shipment. Gov't. cost about $150.00. Operating voltage 4250 DC. Potential 5,000v. **No. 70,127 $9.95 Ppd.**

Newer Model Image Tube



A Farnsworth or RCA tube #6032. Later model than the 1P25. Potential approx. 20,000v (as compared to 5,000v for 1P25). 4½ x 2" dia. at widest point. Dir. incl. **No. 70,160 $12.50 Ppd.**

"Infrared Image Tube & Its Military Applications" 28p. 5 x 8". **No. 9223 25¢ Ppd.**
"Applied Infrared Photography" recording infrared images, 92 pages, 8½ x 11". **No. 9104 $2.00 Ppd.**

Infrared Filter For Photo Light Sources, Sniperscopes, Signaling & Alarm Systems

Glass filter with coating on one surface. In total darkness, so little visible light passes through it is undetectable from 20 ft. even when looking directly at light source. Gov't. surplus. $6.00 value. 5-3/8" dia. x 1/8" thick. **No. 60,033 $2.00 Ppd.**

"See In Total Darkness" With Army Sniperscope!

Army model M3 used for crime detection, painting forgery identification, mineralogy, research labs. For power source use our Ni-Cd batteries (pg. 93) or 6v car battery. Telescope 16¾" long, lens 50.4mm dia. Incl. 5" dia. filter. Electrostatically adjusting focus; knob also adjusts reticle intensity, vertical, and horizontal. Power pack incl. 6v input, 20,000v output, plus power for either Farnsworth #6032 or RCA-A6676 image tube. Unit incl. steel carbine bracket and pistol grip handle with switch control. 7½ x 4¾ x 3-7/8"; shoulder strap, 5-compartment carrying case incl. Shpg. wt. 29 lbs. **No. 85,157 $325.00 T.C.C.**

Replacement Lamps For Above.
Pkg. of 3. **No. 40,156 $1.00 Ppd.**

Intense 10,000 Lumen Spotlight Or Flood—Rated Life 2,000 Hours

For its size, this tungsten halogen lamp is the world's most powerful filament type. Operates in any position! Retains 97% of initial brightness throughout long life . . . has self-cleaning iodine cycle. Excellent indoors or out for spotlights, flood lamps or general use. Tapered screw base allows accurate optical alignment. Use with socket or adapter below. Quartz envelope provides resistance to thermal shock. Internally fused. Color temp. approx. 3,000°K. For 120v AC/DC. Specifications incl.

500w 10,000 lumens. 3-5/8 x ½" **No. 40,779 $8.50 Ppd**
250w: 5,000 lumens. 3 x ½". **No. 40,780 $7.50 Ppd.**
Socket for above lamps. **No. 40,781 $1.50 Ppd.**
Adapter to use above lamps in regular light fixtures. **No. 41,186 $6.00 Ppd.**

Flashtube For Auto Analyzer

FT-118 tube (400-500v) and Pop. Science instructions to build timing light and 8 other timing devices. **No. 40,726 $10.90 Ppd.**

FT-30 low-voltage type for auto timing light. instr. **No. 40,725 $7.50 Ppd.**

LINE SPECTRUM and MONOCHROMATIC LIGHT SOURCES . . .

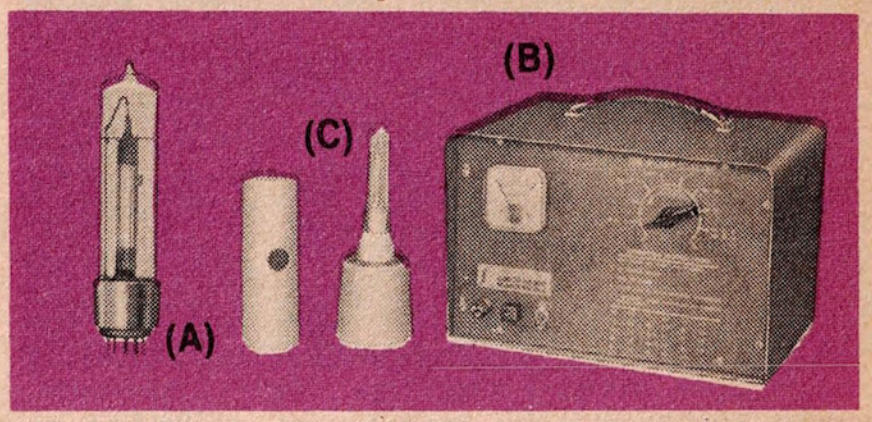
OFFERING HIGH ENERGY & CONSTANCY AND UNEQUALLED SPECTRAL PURITY!

(A) OSRAM SPECTRAL LAMPS . . . New Design!

Now measuring 102mm high x 21mm dia. O.D., with 9-pin DIN base **(requires adapter for Power Supply, offered separately).** All lamps have glass outer bulb, and emit line spectra (light center length: 43 ±1mm center of arc to bottom of base) with no readjustment during operation.

Description	Burner	Stock No.	Price Ppd.
Cadmium (Cd)	Quartz	41,245	$38.00
Cesium (Cs)	Glass	41,244	38.00
Helium (He)	Glass	41,243	35.00
Mercury (Hg10)	**Quartz**	41,242	35.00
Merc. Cadmium (Hg/Cd)	Quartz	41,239	37.50
Merc. (Ultra-violet) (Hg12	Quartz	41,241	38.00
Merc. (ultra-violet) (Hg13)	Quartz	41,240*	38.00
Potassium (K)	Glass	41,238	35.00
Sodium (Na)	**Glass**	41,237	35.00
Neon (Ne)	Glass	41,236	35.00
Rubidium (Rb)	Glass	41,235	38.00
Thallium (Tl)	Quartz	41,234	38.00
Zinc (Zn)	Quartz	41,233	35.00

*Outer envelope window permits short wave radiation.



(B) POWER SUPPLY . . .

Operates All Osram Lamps at Left (adapter required for most: see below). Just dial correct lamp power. Includes lamp-holder (with medium pre-focus socket) and shield (see illust.) Wide scale meter. Operates on 115v AC, 50/60 cycles, 7.5 amps. Shpg. wt. 30 lb.

No. 85,115 $156.50
Trans. Chgs. Coll.

(C) ADAPTER

for converting new-style 9-pin lamps (at left) for use with Power Supply. 3" long x 2" dia.

No. 41,283
$8.50 Ppd.

MONOCHROMATIC CONVERSION TABLE

Wave Length of Spectral Lines in mu[1]	Lamp	Combination of Filters No.	Approx. Transmission at Room Temperature in %
308	Zn	4-29-30	6
313	Hg	4+31	35
326	Cd[2]	4-29-31	6
334	Hg	4-29-32	10
328/30/35	Zn	4+29-32	2
352/3	Tl	2+9-29[4]	8
365	Hg	2-9	20
378	Tl	2+20	30
404/7	Hg	1-3-18-8	0.8
435/6	Hg	9-15-5	3.7
456/9[3]	Cs	8-20	40
468/80	Cd[2]	8-16	27/22
468/72/81	Zn	8-16	27/28/22
509	Cd[2]	6-19-7	20
535	Tl	12+17	34
546	Hg	14-21-11-7	8
577/79	Hg	10-22-10	14
588	He	10+23-10	10
589	Na	10-23-10	10
636	Zn	24	86
644	Cd[2]	24	89
668	He	25+28	—
707	He	27	65
767/70[3]	K	13+27	25
780/95[3]	Rb	13+27	25
794...921[3]	Cs	13-27	10
852...921[3]	Cs	13-26	1

NOTES: [1] One mu = 10 A. [2] The sharpness of the lines increases as loads grow weaker (minimum current however is 1 amp) [3] At low current. [4] At half concentration

FILTERS . . . ONLY $16.25 EACH, PPD.*

2 x 2" size. Table at right shows filters to use.

Filter	No.	Filter	No.	Filter	No.
1	**19,037**	11	**19,047**	21	**19,057**
2	**19,038**	12	**19,048**	22	**19,058**
3	**19,039**	13	**19,049**	23	**19,059**
4	**19,040**	14	**19,050**	24	**19,060**
5	**19,041**	15	**19,051**	25	**19,061**
6	**19,042**	16	**19,052**	26	**19,062**
7	**19,043**	17	**19,053**	27	**19,063**
8	**19,044**	18	**19,054**	28	**19,064**
9	**19,045**	19	**19,055**		**$16.25**
10	**19,046**	20	**19,056**		**EACH**

(D/S No C.O.D.)

No.	Designation	Quantity per Litre of H_2O	Cell No.
29	Nickel Cobalt Sulfate $NiSo_4 + CoSO_4$	303 g + 86.5g	C-1
30	Picric Acid	16 mg	C-1
31	Potassium Chromate K_2CrO_4	150 mg	C-1
32	Nitric Acid HNO_3	n/5	C-1
33	Copper Sulfate $CuSO_4 + 5H_2O$	57 g	C-2

(No. 33 suppresses infrared and remaining radiation transmitted by other filters. Used when isolating lines from 308 mu to 589 mu.

NOTE: Filters 29-33 are liquid types that can be prepared by **you.** These preparations can be used in the special cells listed by each filter. See bottom of page.

No. 34. Transmits 45% at 254 mu.

Transmits the far ultraviolet emitted by the Hg/3 lamp (No. 41,240) and suppresses most visible light. For examination of fluorescence produced by the 254 mu line 2 x 2" size (D/S No C.O.D.)

No. 19,065 $16.25 Ppd.

No. 35. Transmits 50% at 365 mu.

For transmission of the near ultraviolet light emitted by the Hg lamp, and suppression of most visible light. For examination of fluorescence produced by near ultra violet radiation 2 x 2" (D/S No C.O.D.)

No. 19,066 $16.25 Ppd.

GLASS FILTER CELLS

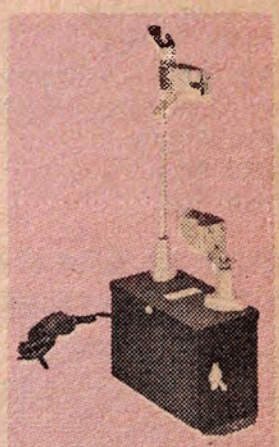
NOTE: Filters and filter cells are not carried in stock, but are handled as special order (allow slightly more time for delivery). (D/S No C.O.D.)

Cell No.	Size	Light Path	Stock No.	Price, Ppd.
C-1	2" x 2"	2 cm	**19,067**	**$15.00**
C-2	2" x 2"	1 cm	**19,068**	**15.00**

Low-Cost Spectrum Tubes and Power Supply

A power supply for delivering voltage necessary to light spectrum tubes, and an integral stand to hold them. This consists of a specially designed 5000v, 7 milliampere max. transformer with on/off switch and heavy 3-conductor, 6-ft. cord. Overall size: 3-1/8 x 6-1/4 x 21".

No. 71,559 $37.95 Ppd.



Spectrum Tubes

(Plucker Tubes). For wave length determination with a grating spectrometer; spectrum analysis by comparison method; for acquainting students with the spectra of better known gases in their pure form; and to show their characteristic color. Capillary tubes are approx. 10 cm long with an electrode sealed in each end. Because the center glass section is especially brilliant when a discharge is passed through the tube, they are ideal for use in front of the slits of spectrometers and spectroscopes. Tubes will operate on induction coils and low milliamp. transformers of 2500v and up. **$4.30 Ppd Each**

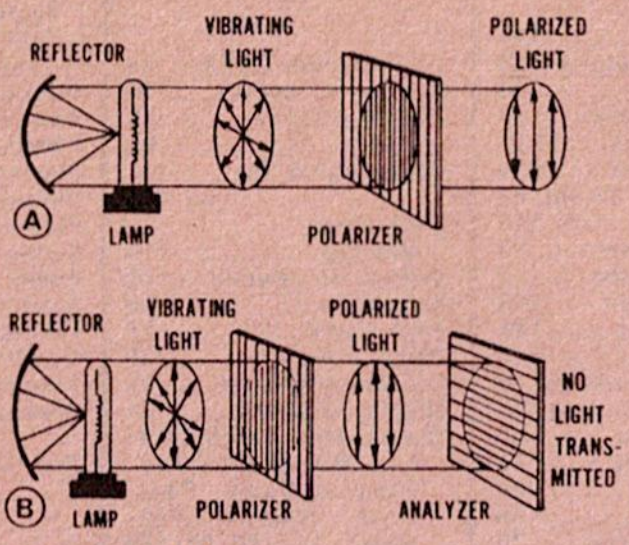
Hydrogen	**No. 60,906**	Nitrogen	**No. 60,911**
Helium	**No. 60,907**	Neon	**No. 60,910**
Mercury Vapor	**No. 60,908**	Oxygen	**No. 60,912**
Argon	**No. 60,909**	Water Vapor	**No. 60,913**
Krypton	**No. 60,915 $5.10**	Carbon Dioxide	**No. 60,914**
		Xenon	**No. 60,916 $8.00**

LAB GLASSWARE, SEE PAGE 54.

POLARIZING MATERIAL

POLARIZED LIGHT—Light coming from a lamp, vibrates in all directions. A reflector, placed behind it, gives light direction (beam), but it still vibrates at right angles to the direction of the beam. A piece of polarizing material (polarizer) in the path of the beam acts like Venetian blind slots, causes the light to vibrate in only one direction—see Figure A.

In the light-beam, place a second piece of polarizing material (analyzer), with its axis (Venetian blind slots) at right angles to the polarizer. Very little light is transmitted—see Figure B. Turning the polarizer or analyzer transmits more or less light . . . the principle behind variable density filters.

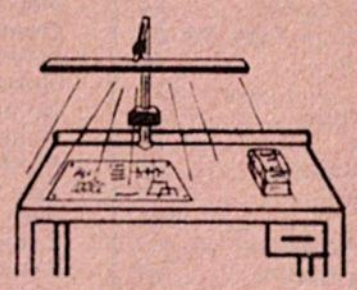


Polarized Light by Shurcliff & Ballard

Describes polarizers & retarders; math & light. Paperback 8 x 5", 144 pgs.

No. 9406 $3.25 Ppd.

Make large sun visors for car and boat.



No glare filter for desk lamp reduces eyestrain.

Selected Seconds At Bargain Prices

Polarizing material made for optical industry requires very high quality standards. Manufacturers reject entire sheets for even a minute defect. These rejects, with minor imperfections, are offered at a fraction of their normal price! Sandwiched between two clear sheets of butyrate plastic, it is rigid, easily cut with scissors, .030" thick. Transmission approx. 30% for single sheet and 22% for two sheets placed on top of each other. When crossed, transmission falls below 1%. Resistant to fading and delamination, dozens of uses: large photo light filters, polariscopes, polarizing slide effects, no-glare camera filters, in microscopy, etc.

No.	Price Ppd.	Size	No. of Sheets
70,887	$ 4.00	6x24"	1
P-70,888	7.00	6x24"	2
P-70,889	30.00	6x24"	10
P-70,890	3.00	6x12"	2
P-60,637	2.50	6x6"	4
P-70,891	25.00	6x6"	50
P-60,638	3.00	6" dia.	2 discs
P-40,990	1.75	3¼"	2 discs

Polarizing Material Between Glass

Made for U. S. Government; rejected for minor flaws. Suitable for most uses. In some cases, glass extends beyond filter's edge. Transmission: 32%; two parallel, 17%; crossed, 2% max. . . . *1st quality.

Stock No.	Price Ppd.	Polarizing Area	Stock No.	Price Ppd.	Polarizing Area
60,468	$ 8.00	3¼x10"	30,537	$ 2.50	2x2"
40,749	4.50	3¼x4½"	71,304*	24.00	10x10"
60,469	12.00	5x8"	30,536	1.00	1x1"

2 x 2" Polarizing Filters

Experiment with polarized light and make polarized color patterns. Light transmission about 40%.

Glass, 0.11" thick, Pkg of 2 **No. P-41,159 $1.50 Ppd.**
Plastic, 0.03" thick, Pkg of 20 **No. P-41,168 $2.50 Ppd.**

War Surplus Glass Polarizing Filters

Small, round filters mounted between glass.

No.	Price	Dia.	Thick.	Trans.
30,529	$0.50	16.5mm	3.5mm	20%
633*	.50	20mm	2mm	20%—2 in pkg.
634*	.60	23mm	2mm	20%—2 in pkg.
40,209	2.00	47mm	2mm	35%

*One cover glass is neutral filter

First Quality Plastic Polarizing Material

The sheets listed give wide angle polarization which allows more latitude in placement of filter and light source. Excellent permanence and resistance to sunlight and heat. Polarized acetate plastic, .010" thick, will not fade under prolonged exposure to light; will last for years! Single sheets are neutral gray; when crossed, they are neutral black. Average light transmission 35%, crossed transmission 2% maximum.

One piece 5 x 5" **No. 70,418 $1.50 Ppd.**
One piece 10 x 10" **No. 70,419 $4.50 Ppd.**
One piece 20 x 20" **No. 70,420 $15.50 Ppd.**

Polarizing Material Bargain

Special purchase of material that was intended for use in eyeglasses, airplane cockpit windshields, and other optical uses. This material was rejected because of slight imperfections that did not meet the extremely high optical industry standards. So we bought it and offer it to you at bargain prices for experimenting, photography, microscopy, unique lighting effects, general display, teaching, etc.

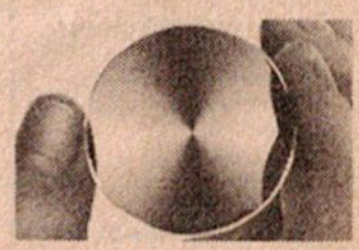
9 sheets (approx. 9 x 22" ea.) **No. P-71,871 $15.00 Ppd.**
2 sheets (approx. 9 x 22" ea.) **No. P-71,872 $4.00 Ppd.**

Variable-Density Filters

Control light transmission. Perfect for experimental labs. Ball bearing mounts of heavy gauge zinc plated steel. Transmission approx. 22%, less than 1% with 90° rotation. Rotates 360°. Holes for easy mounting. Instructions included.

6" sq. (3¾" aperture) **No. 40,992 $6.00 Ppd.**
4" sq. (2 1/8" aperture) **No. 40,991 $4.00 Ppd.**

Detect Polarized Light



1¾" dia. polarized axis finder circumferentially oriented; hour glass wedge indicates plane, polarized light; wedge angle determines direction; wedge contrast approximates intensity. Photographers use to decide orientation of camera polarizing filters. Find ± of dichroic materials, light experiments, science projects. Durable, laminated between glass (only ½ oz.); instr.

No. 41,694 $15.00 Ppd.

Polarizing Color Projector, Polarizing Spinner Disc and Polarized Crystal Slides . . . see page 114.
Diffraction Grating . . . see page 145.

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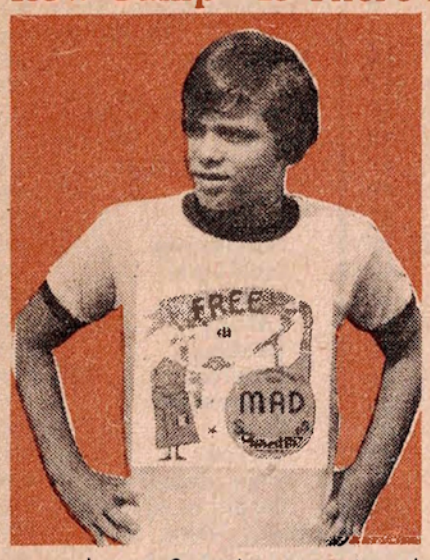
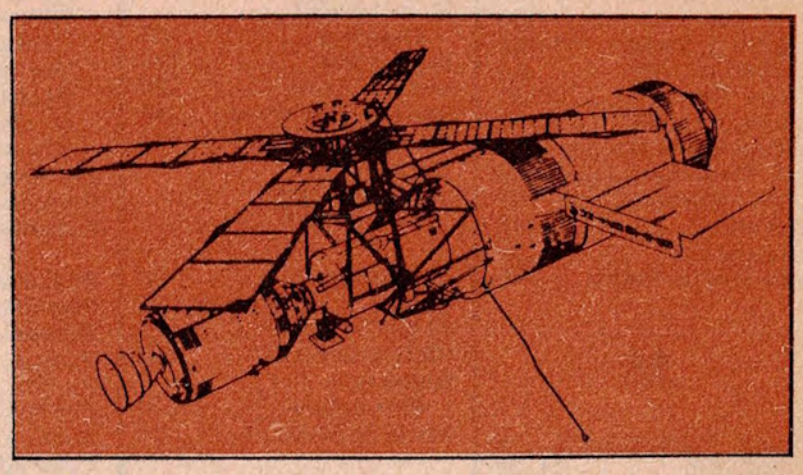
How Camp—Is There Really An Edmund T-Shirt?



You bet there is! So many of our satisfied customers remark how proud they are to deal with us . . . the least we can do is give them a chance to display their pride, and our name (Oops!). Be it "chic," "suave," or just plain neat . . . it's a fine looking addition to any "mad scientist's" wardrobe. White cotton shirt, blue trim, with a unique 3-color masterpiece on the front and a surprise on the back. Wear them to the beach, scare 'em in the lab, parade around the house! Great fun anywhere . . . any time! An unusual gift for a science buff.

$2.75 Ppd. Ea. Small **No. 71,892,** Medium **No. 71,891,** Large **No. 71,890,** X-Lg. **No. 71,893,** Kids-M **No. 71,900,** Kids-L **No. 71,901**

Just Arrived! Skylab Slides



A fantastic set of 20 full-color slides taken during the adventurous May-June '73 Skylab mission. No models or drawings . . . these 35mm super slides are all on-board photographs of the famed "fix-it" crew in action. Great shots including: blastoff; repairing the faulty solar panel; eating without gravity; on-board medical experiments; even a Saturday night bath in orbit. A real collector's item! **No. 42,076 $5.95 Ppd.**

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A partial view of the 11,000 sq. ft. Theater-Store Complex. Over 4,500 scientific items!

All the items listed in this Catalog may be seen in person at our expanded factory store . . . where you have the added advantages of shopping for special buys—merchandise in short supply, one of a kind items, closeouts, etc.

Your whole family will enjoy seeing an exciting FREE Multi-Media Light Show. The 3,000 sq. ft. Light Theater has to be sensually perceived—with your eyes, ears and whole body to be understood and enjoyed. With unique lighting paraphernalia hanging from the ceiling and stereophonic sound pulsing in your ears and on your skin, you are surrounded by a 96-foot curved "involvement" screen that goes beyond your peripheral vision, and exposes you to multi-interflowing 8-foot high psychedelic impressions, that fill the screen. The 25-minute show is completely automated and can be seen daily. We're working on 3 new multi-media shows right now!

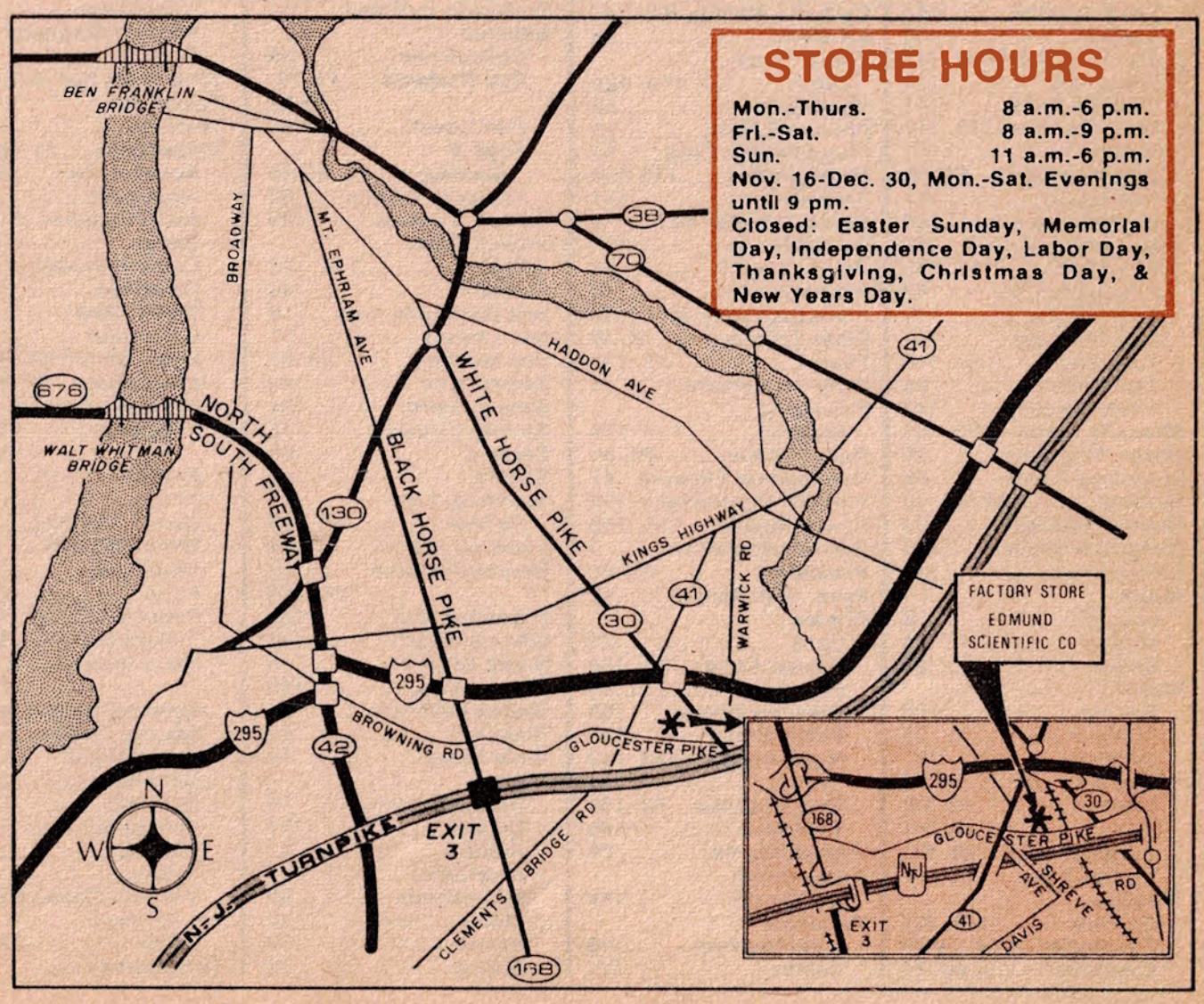
Look through our Japanese Sub Periscope, telescopes, and binoculars . . . stroll through black-light lane . . . contemplate unusual science displays . . . browse through our surplus special section . . .

Make it a point to visit our store—You'll be glad you did.

A few of the many special effect slides.

Kaleidoscope effect.

Dazzles of light.



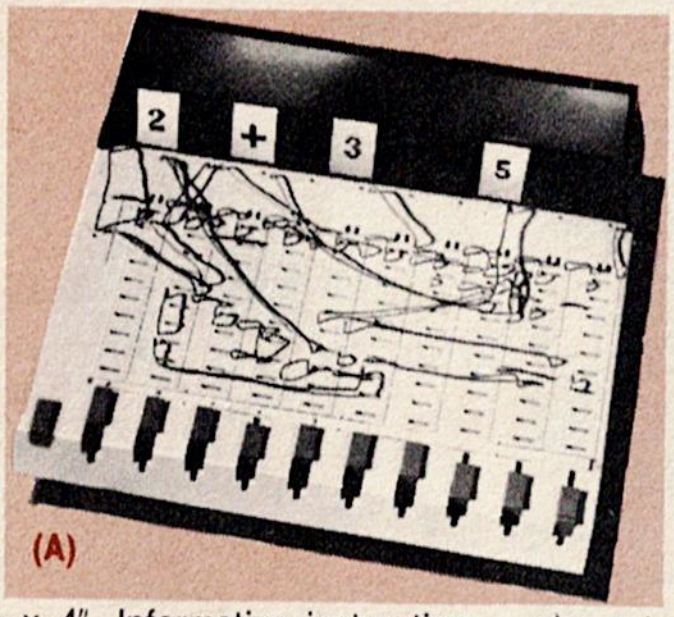
COMPUTER FUN

Computers are revolutionizing our lives and our future. At least a basic knowledge of computer programming, systems, jargon, etc. will be essential to everyone . . . especially anyone in the field of Science. We've searched the market and now offer the best selection of model digital computers to help you learn "What makes computers tick!"

WORKING MODEL ELECTRONIC DIGITAL COMPUTERS

These three get our highest recommendation. Kit A requires building (about 6 hr.) & takes longer to program than Set B, but its manual has more games & experiments. Set B is already assembled & is instantly programmed by movable registers & patch cords. Set C is more advanced, recommended for age 12 & up. All are top-quality, educational & provide meaningful insights into the world of computers & programming.

(A) Electronic Digital Computer Kit



(A)

You build it; program it; learn from it! Perform 50 fascinating experiments— play computer casino, predict weather, diagnose illness symptoms, solve mysteries, test intelligence, try to "outwit" it, even play miniature chess with it. Readout from illuminated control panel. Includes everything needed except 3 "C" size batteries. 11 x 12½ x 4". Informative instruction book leads you step-by-step. For ages 10 and up.

No. 71,434 $31.50 Ppd.

(B) Electronic Digital Computer Set

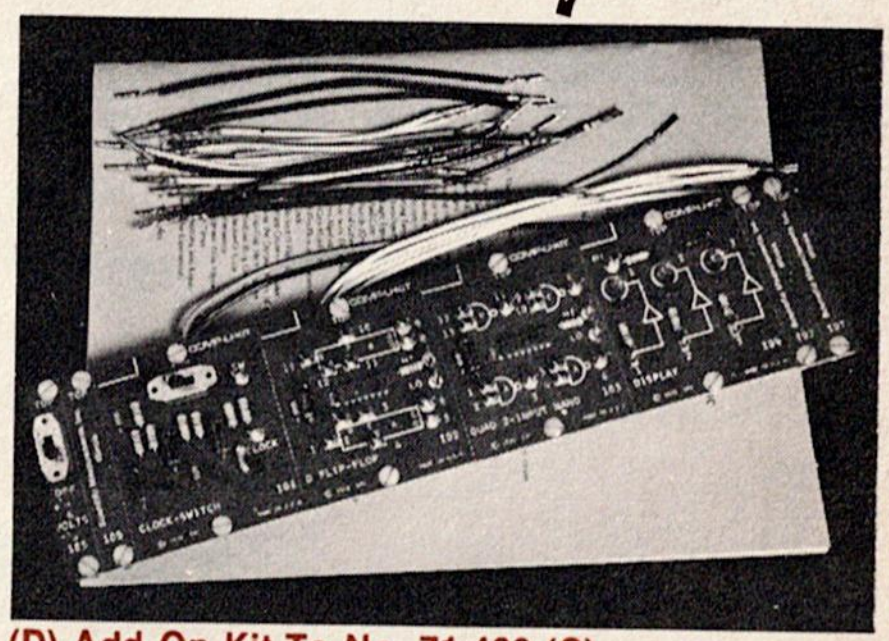
Completely assembled; you program it, give it problems, and get results from electronic readout. It's fantastic . . . solve problems, play games, try to beat the computer. It's easy to program and fun to operate. You'll learn how to program, and soon will be programming it with your own problems and data. Includes 2 manuals; one for games and normal experiments, and the other for more advanced experiments and programming techniques. Big 14 x 15" model computer is really well made of high impact plastic. Features 3 movable registers, patch cords and plugs (used to program electric circuits), visual readout of results, and 2 very instructive manuals. Also incl. cards, dice, and 3AA batteries. Ready for instant use.

No. 71,608 $36.50 Ppd.

(C) Advanced Model Digital Computer

Uses circuit modules that you assemble in minutes. Patch cords easily slide on and off from one patch point to another changing circuits. Work with nand gates, memory cells, flip flops. Experiment with electronic coin flipper, 2 stage binary counter, reaction time, computer clock—23 computer experiments. 74-page instruction manual details easy assembly and all experiments. You learn logic circuits. You get (4) 2½ x 3" soldered modules (clock-switch, flip-flops, quad 2-input nand, display), 20 patch cords, all necessary hardware and parts. Requires one 6v battery (not incl.). Recommended age 12 and up.

No. 71,403 $39.75 Ppd.

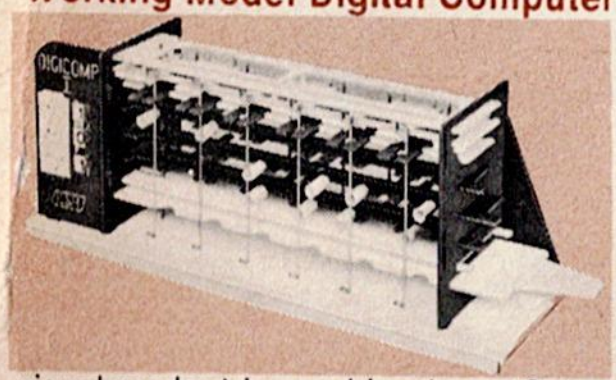


(D) Add-On Kit To No. 71,403 (C)

Greatly extends its use, doubling the number of modules that can be employed from 4 to 8. Contains 20 additional patch cords and related hardware. Also includes a 24-page book (8½ x 11") giving rules for Boolean Algebra and 17 new experiments: operation of nor-gate, or-gate, decade counter, etc.

No. 71,706 $39.75 Ppd.

Working Model Digital Computer . . . Only $5.98



A mechanically operated version. Build it (takes about 2 hr.), program its levers and knobs, and get visual readout by pushing lever. Solves problems; adds, subtracts, multiplies; "memorizes", counts, play games, etc. 12 x 3½ x 4¾". Has 32-pg. manual with problems and 15 experiments. **No. 70,683 $5.98 Ppd.**

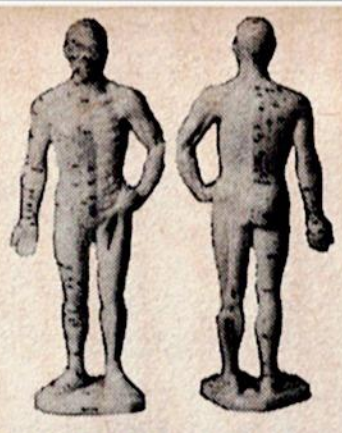
"Detailed Programming." How manual experiments were programmed. 7 x 9¾"; 50 pp. **No. 9080 $1.00 Ppd.**

50 other programs and games No. 9101 $1.50 Ppd.

Electronic Analog Computer Kit Demonstrates Analog Computing

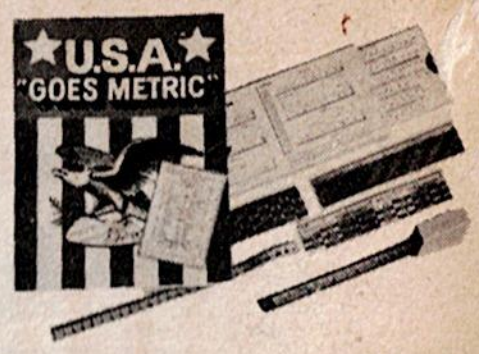
An analog computer doesn't use the binary system but solves problems by measuring differences in voltages. This kit assembles (takes about 6 hrs.) into a working model that multiplies, divides, solves trigonometry problems, powers, roots, log operations. Has 3 potentiometers, meter, diecut cardboard case, manual, 20 x 9 x 2. Uses 2 "D" cells (not incl.).

No. 70,341 $20.50 Ppd.

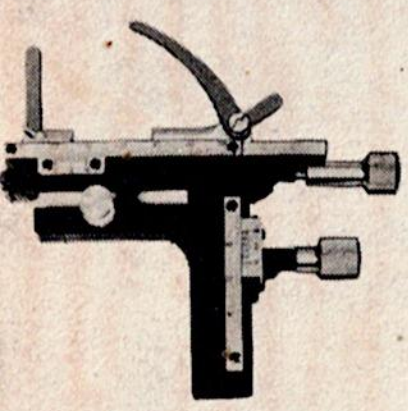


ACUPUNCTURE MODEL
No. 71,778 $12.00 ppd

ELECTRONIC SLIDE RULE
No. 78,011 $99.95 ppd



METRIC CONVERSION KIT
No. 71,844 $5.00 ppd



MECHANICAL STAGE
No. 30,058 $44.75 ppd

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ALPHA WAVE MONITOR
No. 1,635 $128.00 ppd

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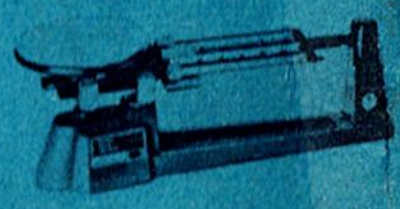
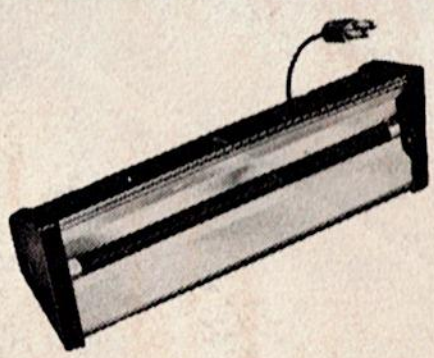
HASTINGS TRIPLET MAGNIFIER
No. 30,344 $10.50 ppd



METRIC TRIPLE BEAM BALANCE
No. 71,695 $34.00 ppd

30-DAY MONEY-BACK GUARANTEE



BLACK LITE MIGHTY MITE
No. 71,274 $14.95 ppd

ELECTRONIC STOP WATCH
No. 1,645 $195.00 ppd

TRICK PHOTOGRAPHY KIT
No. 71,229 $13.25 ppd